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FORMERLY PROFESSOR IN THE ROYAL VETERINARY COLLEGE, LONDON.

GEO. H. WOOLDRIDGE, F.R.C.V.S., M.R.I.A.,
PROFESSOR OF HYGIENE, MATERIA MEDICA AND THERAPEUTICS IN THE ROYAL VETERINARY COLLEGE, LONDON.

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J. A. GILRUTH, D.V.Sc., M.R.C.V.S., F.R.S.E.,
DEAN OF THE VETERINARY FACULTY, UNIVERSITY OF MELBOURNE, AUSTRALIA.

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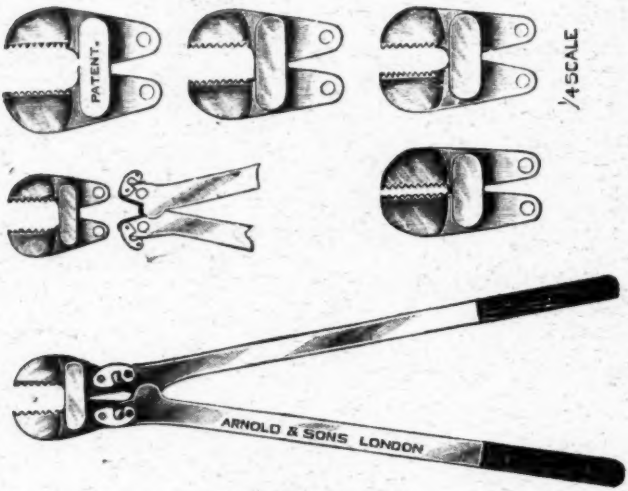

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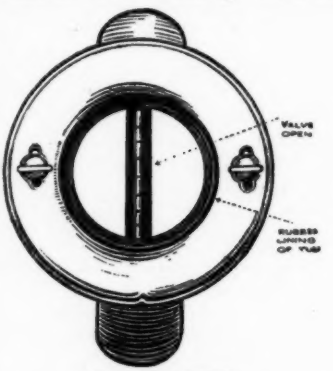

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Austin Peters

THE

VETERINARY JOURNAL

DECEMBER, 1911.

Editorial.

Indexed B. A. L.

FOOT-AND-MOUTH DISEASE.

THE recent statement of the President of the Board of Agriculture that he intends appointing a scientific committee to investigate foot-and-mouth disease has caused great satisfaction amongst veterinary surgeons and agriculturists in general. The new President has apparently decided to appoint two home veterinary experts to proceed to India where the disease is unfortunately very rife, and there to co-operate with two experts nominated by the Indian Government. Their terms of reference will be "to investigate the special characters of the disease, its etiology, the means by which it is contracted and spread, and practicable means of prevention." The personnel of the committee is not yet decided.

Since the announcement of the above intention a very interesting, and, if it should be confirmed, a most important, claim to the discovery of the causal organism of foot-and-mouth disease has been made by a German pathologist, Dr. Siegel. At the recent annual congress of Prussian veterinary surgeons at Berlin Dr. Siegel announced that he had discovered the organism of foot-and-mouth disease in the blood and lesions of affected animals; that he had been able to cultivate it in artificial media; and that in experimenting with it he had been able to satisfy all

the postulates of Koch. He, moreover, claims to be able to produce some degree of immunity. No details are to hand yet, however, and we are therefore unable to offer any criticism as to the probable accuracy of the avowed discovery. In the meantime the announcement must be accepted with reserve, as must obviously be accorded the statement of the discovery of an organism which has hitherto eluded the vigorous and systematic search by other experts of almost all nationalities.

The appointment of a British expert committee is therefore very opportune, and one of their first duties, no doubt, will be to investigate the claims of Dr. Siegel; if he has made out a *prima facie* case, they will repeat his experiments, and either confirm or refute them. We trust they will be confirmed, as the discovery will be one of the greatest possible moment to the whole of the agricultural world.

The President of the Board of Agriculture has also appointed an important Parliamentary Committee "to inquire into the circumstances of the recent outbreaks of foot-and-mouth disease in England, and to consider whether any further measures can be adopted to prevent their recurrence." It is to be hoped that such results will be attained as will enable us to continue to enjoy the markets of the world for our live stock in consequence of the freedom of the British Isles from such animal scourges.

A Correction.

Mr. W. H. Dalrymple, M.R.C.V.S., of the Louisiana State University, writes to correct a statement which appeared on p. 645 last month to the effect that he is a member of the Royal Society of Arts, London. He desires it to be known that he was invited to make application for membership, but declined the honour.

General Articles.

SOME MEMBERS OF THE ROYAL COLLEGE OF VETERINARY SURGEONS WHO HAVE ACHIEVED NATIONAL DISTINCTION IN COMPARATIVE MEDICINE IN THE UNITED STATES OF AMERICA.

By Dr. ARTHUR HUGHES, Litt.M., Ph.D. (Cornell University), D.V.M. (New York State Veterinary College),

(*Continued from page* 652.)

V.—Austin Peters, M.R.C.V.S.

Of the individuals who compose the group of men whose achievements we are sketching in this article, Austin Peters is the only one American born. His birth took place at West Roxbury, Massachusetts, now part of the City of Boston, June, 1859. After private school work in Jamaica Plain, near Boston, he attended the Massachusetts Agricultural College, Amherst, where he graduated in 1881. At the time of his graduation as Bachelor of Science he carried off several prizes. From 1881-1883 he attended the American Veterinary College, New York City, receiving the degree of D.V.S. and standing third in a class of 22. After a year at Harvard Medical School he went to London to study at the Royal Veterinary College. In 1885 he passed the examinations and was admitted to membership in the Royal College. After private practice with J. W. Gresswell, M.R.C.V.S., of Peterborough, and travels in England and on the Continent, where he visited the veterinary schools at Edinburgh, Alfort, and Berlin (1884-1885), Dr. Peters returned to America and took up his residence in Boston.

Almost immediately his worth was recognized, and he was treated as a favourite son and chosen for State veterinary work. From 1886 to 1891 he was employed by the Massachusetts Society for Promoting Agriculture in investigating contagious abortion in cows and bovine tuberculosis. In 1892-1893 he investigated tuberculosis in the eastern part of the State of New York for the New York State Board of Health. Between 1891 and 1901 he was identified with the militia of the State of Massachusetts, ranking as a captain. In 1896 Peters was appointed to the Massachusetts Cattle Commission by Governor

Roger Wolcott. Of this body he was chairman until 1902. That year a law was passed providing for a Cattle Bureau of the State Board of Agriculture, and Dr. Peters was appointed chief annually, 1902-1910. Nor has this series of successes been unaccompanied with honours, nor has it been barren of writings on veterinary topics. Peters never wrote any books, but he has produced papers on tuberculosis, rabies, dairy inspection, as well as parts of the reports of the Massachusetts Cattle Commission (1896-1902), and he wrote all of the reports of the Cattle Bureau (1902-1910). And he has been a veterinarian loyal to professional organizations—member of the American Veterinary Medical Association since 1883; of the Massachusetts Veterinary Medical Association since its foundation in 1884. He was a vice-president of the Veterinary Section of the International Congress on Tuberculosis, Washington, 1908, and member of the International Veterinary Congress at The Hague, 1909, both of which he attended. He is president of the Eastern Live Stock Sanitary Association and veterinarian and trustee of the Bay State Agricultural Society. In short, from the time he left England in 1886 until the present time his life has been full of good works, uninterrupted successes and honours.

Austin Peters is one of the best-known veterinarians in the United States to-day. What, we may inquire, has given him his reputation? In the manufacturing State of Massachusetts, of little value agriculturally, he has been able for nearly a quarter of a century to hold sway over the minds of the better element in Boston and the eastern part of the State, and by example and precept, as veterinary leader, has shown that conservative old commonwealth the usefulness of veterinary sanitary science to the people. It is all the more to his credit that these people were not predisposed to listen to his advice, nor to heed his caution. His name became a by-word throughout New England for intelligence on veterinary hygiene and obedience to its teachings. He it was also, in 1902, when the disease was fast spreading throughout New England, who diagnosed the presence of foot-and-mouth disease, which had gotten a foothold in Massachusetts, but which was shortly stamped out by the American Government. He has been a beacon of veterinary intelligence where it was much needed, and has stood stoutly for professional conduct of State veterinary affairs.

(*To be concluded.*)

NOTES ON A TRYPANOSOME FOUND IN A SHEEP TICK, AND ITS PROBABLE CONNECTION WITH THE DISEASE KNOWN AS LOUPING-ILL.

By Major C. F. BISHOP, R.A.

Tynemouth.

Indexed B. A. L.

The disease known as louping-ill has for many years been the subject of investigations by scientific men, among whom may be mentioned: Fair, Murray, Walley, Gamgee, Goodwin and Robertson, Mathewson, Dr. Hamilton (of Hawick), Williams and Young, Klein, McFadyean, Meek and Greig Smith.

In past years inquiries were made into numbers of possible causes of the disease, such as the influences of sudden changes in the weather, peculiar attributes of the soil, the presence of ergot in the pastures, the presence of keds (*Melophagus ovinus*) and of ticks on the sheep.

About fifteen years ago the theory that ticks had some very close connection with the propagation of louping-ill was rapidly gaining ground, and various forms of bacteria were carefully investigated to ascertain if any of them could be identified as the primary cause of the disease.

In December, 1901, the Board of Agriculture appointed a Committee to inquire into the causes of both louping-ill and braxy, and after four years of careful investigation and numerous experiments, they published, in 1906, a lengthy report in three parts. It is this Committee and their Report, which, for brevity s sake, will be hereafter referred to merely as "the Committee" or "the Report."

The Committee, in their Report, announced that they had discovered, and proved, the primary cause of louping-ill to be a bacillus, to which they gave the name of *Bacillus choreæ paralyticæ ovis*.

The Committee also announced that they had inquired thoroughly into the tick theory and tested it, with the result that they found it to be quite untenable. They dismissed it as a somewhat foolish idea, started by farmers, and founded upon a mere coincidence.

According to the Report then, it was useless to further investigate louping-ill; the whole disease was explained, there was nothing more to be found. However, there still

remained a considerable doubt among some scientists as to whether the Committee had satisfactorily solved the question.

Early this year (1911) Professor Meek, F.Z.S., suggested to me that I should attempt to discover the true cause of louping-ill. He, having studied the disease carefully in 1896 and 1897, was still convinced that the tick theory was the correct solution, in spite of the Committee's adverse decision regarding it, and, when I agreed to make the attempt, it was with the intention of searching for some connection between the tick and the disease, in the form of a protozoal blood parasite, which presumably had escaped the notice of previous investigators. I could only spare time for a few days of work in the field, but hoped to collect enough material for several weeks of laboratory study.

Owing to the kindness of Mr. John Robson, J.P., of Newton, Bellingham, there was no difficulty about getting material to carry out my proposed line of inquiry, although the disease had by no means reached its height at the time.

My idea was, first to get ticks which had gorged themselves with blood from diseased sheep, and specimens of the blood direct from such sheep: then to make smears of the engorged blood from some ticks, and to keep others with a view to examining their eggs, when laid.

Each animal from which material was obtained was registered in my notes as "A" sheep, "B" sheep, &c.; while all smears made from ticks off the sheep were lettered and numbered, as TA1, TA2, TB1, and so on.

On my first day in the field Mr. M. Robson, of Snabdough, showed me what he termed a typical case of louping-ill.

The sheep had been ill for some weeks and was lying with hindquarters paralyzed, so that when lifted to her feet she was quite unable to stand, and fell back at once into her former position. There was no discharge from her nostrils, eyes, or mouth, and no signs of scouring.

From this case I collected, at the time, several ticks, and some smears of blood taken from the bite of an adult tick, but a few days later much more material was obtained from her. She was the "B" sheep of my list.

The first result obtained was when, in examining some slides made of the blood squeezed from gorged ticks, I found one

trypanosome. This single specimen was lying in a good position, apparently in no way distorted, and it had taken up the Leishman's stain excellently in every detail. Its length is 21.75 microns from tip of flagellum to its posterior end; nucleus, central; blepharoplast or centrosome, large and interior to the nucleus; undulatory membrane present and well marked.

Careful examination of the remainder of the slide failed to show any other specimen on it, and it was not until exactly one month later, after about fifty more slides had been examined, that a second trypanosome was found.

Let us consider accurately what we know for certain, and whether there be anything further that we may reasonably infer from these facts.

We know that in a tick taken from a sheep, which was suffering from a disease said to be louping-ill, was a trypanosome. There is reason to believe that the disease was the same as that which was investigated by the Committee as louping-ill:

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the sheep showed symptoms similar to those described both in the report and in the writings of earlier investigators: it was diagnosed as a typical case of the disease as it occurs in the district: and the district, namely, Bellingham, is one mentioned by the Committee as one subject to the disease which they were investigating.

The trypanosome appears to have been in the engorged blood sucked from the sheep, but as the tick was not carefully dissected this is not certain.

There are three explanations of this:—

(1) The trypanosome may have been living its natural life in the tick.

(2) It may have been imbibed from the sheep with blood sucked by the tick.

(3) It may have developed in the tick, from some other form sucked by the tick from the sheep.

The fact that it was a single perfect specimen, with no

recognizable transition or degenerate forms near it, does not much favour any one of these explanations.

Is it likely that the trypanosome has any connection with the disease of the sheep? That the tick is connected with the propagation of that disease?

The symptoms of trypanosomic diseases are very varied, and some of these are at times very similar to the symptoms of louping-ill; for instance, the most characteristic symptom of mal de Caderas is paralysis of the hindquarters, and this disease lasts a few days, weeks, or months.

In ngana and surra, among other symptoms, are fever, emaciation, muscular weakness and paralysis: death occurs in some days, weeks, or months.

The balance of evidence then, so far, seems to be somewhat in favour of a possible connection between the trypanosome in the tick and the disease in the sheep, except for the uncompromising announcement by the Committee, in their Report, that they had carefully tested, and proved—to their own satisfaction—that such a theory is untenable.

On what grounds did they arrive at this very definite decision?

The Committee, in their Report, Section X, Part II, p. 84, say:—

"The fact that louping-ill shows itself about the same time as that at which the tick becomes parasitical on the sheep, has led naturally to the supposition that there may be some ætiological relationship between the two. The evidence, however, is pretty much of the hearsay character; it is lacking in strict experimental confirmation. Ticks abound on sheep where there is no louping-ill, and, conversely, louping-ill is met with, time after time, where neither a single tick is to be found on the carcase nor the slightest vestige of a tick bite."

On the other hand, Meek and Greig Smith, in their "Report on an Investigation into the Cause of Louping-ill," published in the *Veterinarian*, 1896, say:—

"A very general impression amongst farmers and shepherds is that the disease is in some way associated with ticks. Some say that they never saw louping-ill without ticks, nor a place noted for ticks without louping-ill. Reports generally favour such an opinion, though one or two exceptions have been brought forward. Ticks, we imagine, might be present without

the disease; but the evidence for the other case—the disease without the ticks—appears to be very unconvincing. The fact remains, however, that farms and districts noted for the disease are peculiarly rich in the parasite. It might be a mere coincidence; but not only is it true that the tick is a well-known accompaniment, but also that the parasite attacks the sheep in the spring months at the time of the disease, and again if an outbreak occur in the autumn."

Let us turn to the Committee's next objection to the tick theory. In Section X, Part II of the Report is the following:—

"Granted that the tick may act as an intermediary in the dissemination of the malady, there are two possible methods by which the organism may be introduced into the body of the sheep through its agency: firstly, by the tick inoculating the virus through the puncture made by it in the skin; and secondly, by the tick being consumed with the fodder, and in this way infecting the alimentary canal. Against the first conjecture it is to be borne in mind that, whereas microparasites having a morbid tendency, and belonging to the animal kingdom, have been shown in a large number of diseases to be inoculable through the bites of insects, it is doubtful whether a single disease can be traced to this source when the parasite belongs to the vegetable kingdom. . . . It would thus seem that if louping-ill be acquired through the bite of the tick, the disease in this regard would be quite anomalous."

But the anomaly of the Committee only exists if the parasite be vegetable, not if the parasite belongs to the animal kingdom.

The Committee had already made up their minds that no parasite, except the one they had discovered, could possibly be concerned in the disease. If the parasite to be considered be a trypanosome their argument becomes of no value.

It seems quite possible then that the "Tick Theory," combined with an animal parasite as the primary cause of the disease, might well explain the symptoms shown, and the very remarkable fact of the regular appearance and disappearance of the disease at a particular season of the year.

Some of the Committee's experimental work appears to afford very valuable evidence in favour of the tick theory:—

They took some ticks from cases of the disease, carefully examined their internal parts, and found no signs of the *B. choreæ paralyticæ ovis* in them.

Some of the ticks were then mashed up in sterile water, and the mixture administered to a sheep by its mouth. The sheep was none the worse.

Some of the mixture was then inoculated subcutaneously into another sheep. The sheep died of louping-ill.

The Committee came to the conclusion that some of their bacillus must have been attached to the outside of the ticks.

Again, the Committee procured eleven sheep, absolutely clean, from a farm free from louping-ill.

They put four out to pasture on foul land. Three died of louping-ill.

They put one out muzzled, to show that if it could not eat the grass it would not get the disease. It died of louping-ill.

The Committee decided that the muzzle was a bad one.

They then put out six more with better muzzles on, and fed them in a shed at night on turnips and hay; again to show that they would not get the disease. One died of louping-ill.

The Committee decided that the hay must have been contaminated with their bacillus, and argued that had the disease been due to tick infection, there would still be no explanation of why three out of four died when they could eat the grass, while only one out of six died when prevented from eating.

Nevertheless, there is an explanation. The good muzzles are carefully described in the Report as "in the form of a leather cap with breathing holes, enveloping the snout as far up as the eyes, thus completely preventing the animal from eating."

Ask a farmer to get you a tick off a sheep, and he will generally look first round the cheeks, ears, and neck. Now, nearly all the ticks there would have got on to the sheep by its snout, or else directly when its head was bent down into the grass to eat. If, then, you cover the snout with a smooth leather muzzle, you at once close one of the best channels by which ticks gain access to the sheep; also, it is probable that as soon as the animal finds that it is useless for it to try to graze, it will keep its head up out of the grass.

Put gaiters on your sheep, and leather muzzles, and you would probably find a wonderful decrease in the number of cases of louping-ill: the sheep might die of starvation certainly, but that is a side issue.

Meek and Greig Smith tried a better form of protection from ticks, namely, a dressing of obnoxious oils, and allowed the dressed sheep to graze on foul land. Out of seven, none got louping-ill.

But in the Committee's Report there is still another strong argument against the "tick theory."

In Part I, p. 7, we find the following:—

"From the symptoms of the disease, and from the fact of its affecting one animal after another, we suspected, naturally, that the blood or tissues of the body might be the seat of growth of a contagious germ, and the blood, accordingly, was examined with the greatest care. . . . Suffice it to say at present, that after having sought laboriously through case after case for an agent in the blood which might explain the mystery of the disease, we signally failed to detect anything which could be taxed with this significance. . . . So far as the blood is concerned, therefore, the conclusion we arrived at was, that it did not contain any parasite, animal or vegetable, and that it did not differ in any material respect, histologically, from the blood of a healthy animal. We compared, over and over again, the blood taken from sheep in perfect health with that taken from those suffering from louping-ill, and found it impossible to make out any difference between them."

Now, the whole "tick theory" is founded on the belief in a blood parasite. It may be that the parasite is sucked from one sheep by a larva, or nymph, and transmitted to another sheep by the tick when it has changed into nymph or adult respectively; or it may be that the parasite, being imbibed by the adult tick, is transmitted next season by the larvæ hatched out of the mother tick's eggs. But a parasite there must be, or the theory falls to the ground.

Up to the present, although a trypanosome has been found in a tick, all examinations of blood or organs of diseased sheep have failed to show the same form in the sheep.

UNIDENTIFIED DISEASE AMONGST YOUNG CATTLE.

By T. E. PALGRAVE, M.R.C.V.S.

Department of Agriculture, New South Wales.

Indexed B. A. I.

So far as is known, this disease has only been observed in the neighbourhood of Benville, Coff's Harbour, North Coast District of New South Wales.

It attacks young cattle from six months of age up to those aged 2½ years, and those in good condition appear more susceptible than those which are poorer.

It may be as well to state that the farmer on whose property the disease exists has lost upwards of 50 per cent. of his young stock during the last three years; that so far no plant has been identified that would cause this loss; and that the disease only appears during a period extending from the early part of September to the latter part of October. It also appears to be more prevalent in dry than showery weather. There is always abundance of paspalum grass as feed, and there is also a quantity of bracken which the cattle do not touch.

Symptoms.—High temperature, often rising to 108° F. or over; rough coat; rather rapid but not laboured breathing; staggering gait behind, as though the loins had been injured; loss of condition; and sometimes, shortly before death, there is a passage of bloody fæces, mixed with thick, stringy mucus, almost like a bowel cast. Occasionally a small sore is found on the muzzle.

A remarkable feature is that the animal will continue feeding right up to the time of its death—even when lying on the ground—and grass has been found in the mouths of dead animals.

Death takes place in from 18 hours to 15 days, which would point to there being an acute and subacute form of the disease.

Post-mortem Appearances.—Petechial markings are generally present in the mucous membranes of the nostrils, vagina, and vulva, but these are not constant; when present, they are about the size of a caraway seed. Ecchymoses on the diaphragm and pleuræ and hæmorrhagic patches (sometimes a single patch) are found on the diaphragm. Slight *ante-mortem* congestion of the lungs and a pleuritic patch on the left pleura; a yellowish effusion in the thoracic and abdominal cavities somewhat similar in colour to that of contagious pleuro-pneumonia. A few petechiæ on

the pericardium, but the heart otherwise normal. Lungs normal, except for the slight congestion already noticed, and the presence of a few ecchymoses on the outside. No marbling of the lung tissue or thickening of the bands of connective tissue. Gall bladder showing ecchymoses on its outer coat, very distended and full of dark viscid bile, in appearance like that found in rinderpest. Ecchymoses present on capsules of liver, kidneys, spleen, and pancreas. The tissues of the last three appear normal on section; that of the liver is bile stained, but otherwise normal. A considerable amount of fatty tissue exists about the trachea, œsophagus, and kidneys, which is stained a bright golden yellow. The cardiac, bronchial, mediastinal, suprasternal, popliteal, and mesenteric lymphatic glands considerably enlarged, deeply red on section, and ecchymotic externally. Bladder and uterus normal, but a large clot of rose-red, jelly-like material lying near the uterus; mesentery and peritoneum ecchymotic. Inflammation of the mucous membranes of rectum and intestines—large and small—that of the rectum being very marked and that of the intestines patchy. Marked ecchymosis of the outer coat of the intestines. A number of large masses of clotted blood present in the large intestine, one mass being fully 6 in. long and occluding the bowel.

The mucous membrane lining the rumen, reticulum, and omasum scraped away easily in large patches, but showed no signs of inflammation; the abomasum appeared normal internally. All the four stomachs contained undigested food and were slightly ecchymotic on their outer surfaces. There were occasional blood extravasations into the muscular tissue of the brisket and abdomen, but they were not marked.

On first investigation this disease was supposed to resemble hæmorrhagic septicæmia, but the following comparison will show that marked differences exist.

Hæmorrhagic Septicæmia.	*Bouville Disease.*
(1) Hæmorrhagic areas in subcutaneous, subserous, and muscular tissues; the areas are of varying size.	(1) Present in a modified degree.
(2) Bloody extravasations in the subcutaneous tissues, usually about lower portion of neck.	(2) Very slight indeed.
(3) Mucous membranes and submucous tissues of mouth, tongue, pharynx, and larynx greatly thickened, inflamed, and infiltrated with serum.	(3) Absent.

Hæmorrhagic Septicæmia.	*Bouville Disease.*
(4) These mucous membranes are reddish-purple, and show hæmorrhagic spots.	(4) No such discoloration, but a very few petechiæ.
(5) Thickening of mucous membrane of trachea and bronchi, and interstitial thickening of the lungs.	(5) Absent.
(6) Diaphragm, pericardium and heart walls show many hæmorrhagic points, and larger bloody extravasations.	(6) Present in a modified degree on diaphragm and pericardium; absent on heart walls.
(7) Sometimes a serous pleurisy with a fibrinous exudate.	(7) Present.
(8) Intestinal submucous and subperitoneal tissues show hæmorrhagic spots, large bloody suffusions, or even gelatinous infiltrations.	(8) First two lesions present, but no gelatinous infiltration.
(9) Hæmorrhagic inflammation of intestine, and staining of contents with blood.	(9) Present.
(10) Muscular system throughout shows hæmorrhagic areas.	(10) Present in a modified degree, and not well marked.
(11) Abdominal viscera, liver, spleen, and kidneys often present hæmorrhagic lesions.	(11) Ecchymoses present on capsules of liver, spleen, and kidneys.
(12) Lymphatic glands of neck swollen and infiltrated with blood serum.	(12) All lymphatic glands examined swollen and dark in colour, especially those of lungs and mesentery
(13) Absent.	(13) Intense yellow staining of tissue around trachea, œsophagus, and kidneys.
(14) ,,	(14) Gall bladder very distended, ecchymoses on covering, gall viscid and dark coloured.
(15) ,,	(15) Liver tissue bile stained.
(16) ,,	(16) Jelly-like material in abdominal cavity near uterus.
(17) ,,	(17) Large intestine contains much clotted blood.
(18) ,,	(18) Mucous membrane of rumen, reticulum, and omasum scrapes away readily.
(19) Inoculable by direct method.	(19) Inoculation by direct method has so far failed, as the disease has not been reproduced.

Of course it is possible that the Bouville disease may be reproduced through the medium of an intermediary host, which while not in itself susceptible to the disease may harbour the pathogenic micro-organism—assuming that one exists—and thus transmit the disease to another animal of the same species as that from which the micro-organism was first obtained.

Ticks of various kinds are present in the locality, but up to date the cattle tick which transmits red-water has not been found.

Lung worms have been found in small quantities in most of the affected cattle, but there is nothing to suggest that they act as intermediary hosts. I should be glad if any readers of the VETERINARY JOURNAL, who have come across any disease simu-

lating this one, would publish their experiences. To me the disease is a strange one, and I have been unable to come to any definite conclusion as to its cause; its nature appears to be septicæmic.

SOME DISEASES AND PARASITES OF OSTRICH CHICKS.*

Indexed B. A. I.

By W. ROBERTSON, M.R.C.V.S.

Acting Assistant Director of Veterinary Research, Cape of Good Hope.

ALTHOUGH the continued advance in the price of the ostrich feather has attracted much attention and capital to the industry of ostrich farming, our information upon the diseases of the bird, particularly when in the chick stage, is still very scanty. When men, to whom farming is a new thing, or new as far as ostriches are concerned, start, there are bound to be many mistakes made, and as a result many failures must follow. The great difficulty of the observer is to distinguish between the mortality amongst chicks due to bad management and the mortality due to the ravages of a specific disease. Many men when first visiting a prosperous ostrich farm and seeing the trim breeding camps with their aggressive and well-fed occupants, and hearing that last season's chicks fetched an average of £10, and all this season's are booked (before even the eggs are laid) at a higher figure, are inclined to think that this style of farming is Utopian, and that it is "picking up money." They straightaway invest in high-priced birds and start in chick-rearing; the results are frequently disastrous.

It is not my province, nor my intention in the present instance, to deal with the subject of chick-rearing; every district and every farm, let alone often every man, has his own idea on this matter. But there are certain broad principles common to all, and it is not out of place to make some slight mention of them before dealing with one or two of the chick ailments which have come under my notice during the past two seasons; and though the work in their connection has been fragmentary and inconclusive, I think that what knowledge is at hand should be placed at the disposal of the new industry, as it

* From the *Agricultural Journal of the Union of South Africa.*

is only by extensive experiments (impossible in a laboratory) carried out by the farmer himself that we can learn how the theoretical experiment will work out in practice. Many men taking up ostrich-breeding and having in view the rearing of chicks for sale, and to strengthen their feather flock, mate unsuitable birds; I say unsuitable for mating, though they may both be first-class birds. I take it that the position is just this: the average ostrich is no more pure bred than the ordinary horse, and any farmer knows what is the result of breeding from half-bred stock as far as results are concerned, and how very unlike either parent the progeny may be. To take another simile: if one were to mate a white barn-door cock and a white barn-door hen, the eggs would hatch piebalds, white, blacks, &c., *i.e.*, the progeny were displaying the trait called "atavism," or throwing back to some earlier ancestor. But if you bred the selected white chick along the same lines, always selecting those likest the type you wished to produce, in time you would get a breed from a pair of which you might reasonably hope to get a fair percentage of chicks reproducing the parent type. So in the ostrich; you can mate a fine cock and a fine hen, and get chicks which are absolutely rubbish, but certain breeders have now so bred from certain strains that the greater percentage of their chicks throw true to parent type. Again, certain strains will, as the breeder says, "nick" with each other, and this should be borne in mind when selecting pairs, otherwise you get the chick not only mixed in quality, but many may be inferior to the parents.

Hatching.—I must here say a few words on this, as on the constitution of the chick depends his fitness to survive the troubles of his early life. Natural hatching, under a shelter, is no doubt the best plan; but as a bird starts sitting after laying the clutch of eggs she can cover, a man who has given a long price for a pair of birds wants more eggs from the pair than this. The usual plan to adopt is to take the eggs away as laid, transfer to the incubator or other hen, and allow the hen to sit on her second or third nest. Personally I think it is a great mistake to let a hen have three nests in one season. The chicks of the last eggs are often unfertile, and it stands to reason that the chicks cannot be so sturdy or start life with the constitutions of those off the first nest, when the parents were

in the vigour of the early mating season. I also think it is wrong to excite a cock bird's sexual appetite with such drugs as cantharides, cayenne pepper, &c., *for a prolonged period of time*. A few doses at the commencement of the season may make a backward bird pair and start the breeding, and do no harm, but it is this continual excitation of the sexual functions that I think is useless. You can certainly increase the frequency of the sexual act, but you cannot increase the percentage of fertile eggs by that method.

Breeding pairs are generally camped off in May, and by the end of that month may have nests. The plan is to feed heavily until the hen starts laying, then reduce rations a little. Personally I think from what I have seen that too fat parents produce a large percentage of unfertile eggs, and I do not like to see too fat *breeders* camped off.

Chicks.—Chicks begin to appear about the end of May or even earlier, and the best chicks are those which get a fair start before the cold weather of August commences. The most successful chick-rearers never give the newly-hatched birds food for at least twenty-four hours. The yolk sac of the ostrich persists for nearly ten days after the chick has hatched, and affords quite enough nourishment for the first twenty-four hours of the creature's existence. It is also the persistence of this yolk (or yelk) sac which accounts for the chrome-yellow-coloured liver of the young ostrich chick.

Chicks should have as much sun and light and air as possible. Cold will not hurt them, and they stand a lot of rain. Wind is their worst foe. When this blows they simply lie down and refuse to feed, and dwindle away. The most critical time for chicks is at fourteen days old, over that they go ahead.

Administration of Medicine to Chicks.—Ostriches are comparatively easy things to dose; their œsophagus is big, and the risk of choking (provided care is taken) infinitesimal. Liquid drugs are generally given from a small narrow-mouthed bottle, and solids in the form of pills. I have lately used with much success as a medicine vehicle the gelatine capsules in which are wrapped horse-balls (similar to the gelatine capsules of the human pharmacist on a large scale). These are neat, clean, and easy to administer; there is absolutely no danger of choking, and the dose can be made ready.. It is somewhat of an under-

taking when one has to dose, say, eighty chicks with oil on a cold morning; the oil does not completely leave the bottle, runs over the neck, and the result is each chick does not receive exactly the dose we want it to. With capsules, the lot can be charged the night before and remain ready for the morning. They are worth a trial by ostrich men, and are very cheap.

Dronkziekte in Chicks.

Here the chicks seem to lose the power of maintaining their balance (quite distinct from paralysis); as it is termed, loss of co-ordination of movement. Generally seen in chicks from two to six months old; they seem to stagger, stand on tiptoe, and to be continually on the verge of falling forward, and using the half outstretched wings as a balance; feed well, and are often very fat. Sometimes only a percentage of the batch are affected. The attack appears suddenly, and does not appear to spread from bird to bird.

This affection is a very annoying one; it throws chicks back in condition just at the critical growing and developing time of their lives. If chicks two or three months old get anything the matter with them they never seem to grow out, and are always stunted and undersized all their lives.

Cause.—I have not had much experience with the treatment of this disease; the seven outbreaks I have seen have been at such distances from town that personal supervision and the studying of the effects of various drugs was impossible. *Post-mortem* shows the body to be absolutely normal, and opinions are divided as to the actual cause of the disease. It may be due to some strain in the birds' breeding, producing nervous lesions in the brain, or due to the direct effects of some specific germ. It is difficult to accept the vegetable poison theory, as only a percentage out of a lot running together show the symptoms.

Treatment.—In the few outbreaks where I have been able to give the matter personal supervision I found good effects from the administration of a purgative, followed by repeated doses of a nervous sedative.

Case I, February 18, 1911.—A farmer in the neighbourhood called *re* above disease in his chicks; had about twenty in a lot of fifty affected; gave two lots of pills, one containing aloes barb. gr. x, the other chloral hydrate gr. xx, with instructions to

give the aloes pills first and then follow up with daily dose of the No. 2 pill.

February 21, 1911.—Visited the farm and saw chicks; owner says they are better; no more sick.

February 25, 1911.—Saw chicks again; those which were affected are all doing splendidly, but are going to be stunted in growth, having received a check or set back, and will never probably grow out to the same size as their contemporaries; the feathers of the affected chicks without an exception show a deep distinct "bar."

Ophthalmia in Ostrich Chicks.

During the past season several breeders have been troubled with a variety of ophthalmia in their chicks and half-grown birds. The disease starts somewhat suddenly and is undoubtedly infectious. At first there is blinking of the eyelids, a flow of tears, and in a couple of days the lining membrane of the eye becomes inflamed and angry-looking, the lids are kept closed, and the watery discharge (in some cases) changes to pus, which glues up the eyelids. On forcibly opening them the eye is full of a thick sticky material, and the eyeball itself is blue and blurred. If left untreated, or treated improperly, several things may happen, and the sight of the eye may be lost or permanently impaired. After recovery one can often notice which birds have been affected by the puckering of the eyelids.

Infectious Nature of the Disease.—Observations, and the opinion of the farmer, pointed to the infectious character of the disease. In order to settle it I carried out the following experiment: Three ostrich chicks, four months old, were confined in a pen which had never before held birds. A swab of cotton-wool was then taken and rubbed over the eyelids of an affected bird and transferred to the eyes of the clean birds. Ophthalmia appeared on the morning of the fourth day in all three. This experiment was repeated and gave identical results.

Treatment.—As soon as the disease appears the farmer must isolate the affected bird, and dress, not only it, but all the rest of the flock. I have seen an outbreak cut short by careful daily dressing of all the in-contact birds. I have tried many remedies, including sulphate of zinc, boracic acid, lead lotion, ointments, &c., and find the best results to follow the free use of a

weak solution of corrosive sublimate in water, 1 to 1,500. I use an eye-dropper, or an ordinary fountain-pen filler will answer very well, and at first the dressing should be carried out twice daily. Run the bird into a plucking box, catch them by the lower jaw, turn the head on one side, and drop in about ten drops of the solution, let the superfluous liquid run out around the eye, dress the other eye similarly, and let go.

So far this treatment has been an unqualified success. Care must be taken with the lotion, which should carry a poison label. I will just give in detail the course of an ordinary outbreak: Mr. H. M., farmer, near Grahamstown, when seen, had thirty chicks affected. First symptom noticed was swelling of the eyelids, which rapidly became distended with a clear fluid (subsequently purulent), a purulent exudate appeared along the inner edges of the eyelids, in many cases gumming them together. Nine of the chicks were four months old, the remainder varied from six to nine. There appeared to be much irritation and pain, the birds were constantly shaking the head and rubbing the eye on bushes, fences, and one another. The owner thought the chicks contracted the disease from sleeping in low-lying river paddocks, and suggested as a direct cause the "bites of insects," mosquitos, &c. These birds were treated twice daily with 1 in 5,000 watery solution of perchloride of mercury; the results were very satisfactory. Several were not treated; in these the disease ran its course in about twenty days; one chick lost the sight of one eye, in others the eyelids showed marked and lasting irregularities; the eyelashes were twisted, and there was marked puckering of the skin of the orbit, and even after a lapse of four months the eye lesions can be noticed in the untreated birds, though all inflammatory changes subsided three months ago.

I have met with several cases of blindness and defects in sight in old birds, directly traceable to a previous attack of ophthalmia.

Eversion of the Rectum in Chicks.

This should more correctly be termed, Eversion of the Cloaca, the end of the gut.

This is a somewhat common complaint, and in some seasons assumes the nature of an epidemic. The course of the disease is often very rapid, and the mortality assumes a high percentage.

The disease principally affects chicks of a few weeks old, but I have seen several cases in old—even in a sitting bird. It commences by a straining, and wetting of the feathers around the anus, which are soiled with the discharge. There may, at this stage, be some slight protrusion of the gut; this gets more pronounced, until a piece the size of a sausage appears, and may even get so large that the chick can tread on it. I have seen it in a month-old chick assume the size of a large oval orange.

Treatment.—In the advanced stage little can be done. I have replaced the gut after bathing in alum and warm water, and kept it *in situ* with a stitch "figure-of-eight fastening," from skin to skin across the rectum. As soon as a case is noticed I advise getting the following made up at the chemist's: No. 1: gelatine capsules, each to contain castor-oil half an ounce, and sandal wood oil half a drachm. Get as many doses as you have chicks and give at once, next day, and for the two following days, *i.e.*, three doses in all; Pill No. 2: each to contain powdered opium 25 gr., prepared chalk 30 gr., and powdered ginger 20 gr.

I am of opinion that the cause is some irritant in the urine (the bird has a common orifice for the evacuation of the contents of kidney and bowel). This irritant acts upon the soft mucous lining of the end of the gut (the chick is growing fast and the tissues are soft and yielding and not set), causing much straining, a small part protrudes, the muscle at the orifice of the anus then contracts and confines that piece into which blood comes and cannot get back, it swells further, more gut is protruded, and so on.

I am very satisfied with this treatment; it is worth a trial.

Parasites in Ostrich Chicks.

The external parasites of ostrich chicks affect them and us very little, and it is the internal, or intestinal parasites, which cause often serious mortality, and always much loss of condition.

It cannot be too often urged that unless chicks have a good start they will be more or less handicapped for the greater part of their career, both in regard to constitution, size, and feather production. Professor Duerden has shown most clearly that ***any set-back to a bird can produce a bar or irregularity of growth***

in the feather at that time; and I think that the often defective tips in spadonas and first after chicks are due to the presence of internal parasites. The chick, at the early stage of its existence, is growing very rapidly, and cannot grow out and develop in the way it should when its constitution has to support, in addition, a mass of tape-worm, or even wire-worm.

Tape-worm.

I have heard a breeder say "All chicks have tape-worm." That is not strictly correct, but tape-worm is more or less a disease only affecting young birds. It is rare to find a full-grown bird so affected, but I have seen the gut of young birds so full of the parasite that it was a matter for wonder how even the food managed to pass along.

The tape-worm of the ostrich (*Tænia struthionis*) belongs to the class of parasites which require two animals or hosts for their complete life cycle, just as in the case of the tape-worm of man; there the worm is voided and picked up by the pig, in whose body it develops into the little bladders called measles; man eats this flesh, and in his body these bladders again grow into worms. In the case of the ostrich tape-worm we do not yet know what is the other animal through whose body the parasite must pass to complete its life cycle, and when one thinks of the immense number of animals in the veld who might act as this intermediary bearer (as it is termed), the search will doubtless be a long one.

Age at which the Chick becomes Infected.—Ostriches can, and are, reared without ever becoming infected with tape-worm. This sometimes occurs on veld new to ostrich farming. There, no doubt, the intermediary bearer, if it exists, is still uninfected; but sooner or later a fresh batch of chicks is brought and starts the parasite.

I have found chicks as young as three weeks well infested with the parasite, and from that age on to maturity, say two years old, they are the commonest parasite of young birds.

Symptoms.—If conditions are good and the food plentiful the birds can nourish both their own constitutions and the tape-worm's, but if the food ration falls, climatic condition becomes unfavourable, or the chick becomes ill, the parasites are served first and the bird's constitution suffers. The symptoms are those

of general ill-health, paleness of the mucous lining of eye and mouth, and the presence of expelled portions of the worm in the dung; this, of course, is the best and only certain symptom. These *nits* as they are termed are the ripe segments from the hinderpart of the body of the tape-worm, and are in reality simply sacs of eggs, and are always found on the outside of the dung pellets, having been brushed off from the parasite's body in the passage of the dung through the bowel.

Treatment.—The removal of the tape-worm is simple enough and accompanied by very little danger. For their eradication I find nothing so good, certain, and safe as *Petrol—Motor Car Spirit, Pratt's Green Label.* Care must of course be exercised in the dosing; a drop of petrol—or for the matter of it almost any liquid—down the bird's windpipe will be accompanied by serious and often fatal consequences.

In drenching birds it is always advisable to cover the opening in the windpipe with the fingers of one hand, and pass the bottle over them; it is also well to hold up the bird's head after drenching for a few minutes. Some birds possess the power of inverting the neck and regurgitating fluid from the stomach; this, if it runs into the mouth, may also run into the windpipe and choke the bird. Petrol is not poisonous in anything like reasonable doses. For instance, I have given a two-year-old bird a wine-bottle (27 oz.) daily for fourteen days, and a six-weeks-old bird 10 oz. daily for a similar period of time without producing any ill-effects. I find an occasional dose of petrol to chicks of marked benefit, and its use is very widespread in the ostrich-breeding districts, where some men I know dose every six weeks as a regular thing.

I am of opinion that tape-worms do more harm than we think, and injure the bird in other ways than by merely abstracting so much nourishment from the body. Wherever a tape-worm attaches itself by its row of hooks it makes an actual wound in the bowel wall; this makes a breach in the body's defences for the inroad of germs from the bowel, and I believe that this is the way some of the ostrich chick epidemics start. I have counted in one ostrich of nine months old over *two hundred tape-worms*, the aggregate weight of which was nearly *three pounds*, and the amount of nourishment necessary for their subsistence must have been considerable.

In experimenting with petrol I find the following list of doses quite safe; in several instances much more can be given with safety, but was, I take it, simply wasted.

It is advisable to fast chicks a little before dosing, but if they are at all weak or thin do not starve for the first dose. The petrol being volatile at a temperature lower than the bird's body speedily becomes vapour, and penetrates through the whole of the bird's intestinal tract in a remarkably short space of time.

Dose of petrol, given pure:—

1 and 2	months	old birds	get	½ oz.
3	,,	,,	... ...	1 oz.
4	,,	,,	... ...	2 oz.
5	,,	,,	... ...	3 oz.
6	,,	,,	... ...	4 oz.
7 to 11	,,	,,	... ...	5 oz.
12	,,	,,	... ...	6 oz.
Full-grown		,,	... ...	8 oz.

It is emphasized that the petrol must be given *pure*, not mixed with water.

Wire-worm or "Vrot-maag."

This parasite, and some notes on its life history, have been dealt with in the *Cape Agricultural Journal*, August, 1910. I am still of opinion that the best method to eradicate these parasites is by repeated dosing with lime and sal ammoniac. I have dosed at three weeks' intervals (with a preliminary dose of paraffin) without any ill-effects on the bird's constitution, and with most beneficial results in regard to the wire-worm, for twenty-seven weeks, i.e., nine times, simply to prove to my own satisfaction that the dose had nothing in it deleterious to the bird's constitution, and that there was no harm in repetition. It is useless to attempt to get rid of this parasite by one or two doses, and the golden rule for a breeder on a farm where wire-worm (*S. Douglassi*) is rife is watch your chicks and dose before they get too bad. If you wait until they are down in condition some will certainly die, whatever you dose with.

Symptoms.—These have already been gone into; the bird goes off condition, the subcutaneous tissue and skin becomes white, instead of the golden yellow colour seen in healthy birds, the mucous lining of the mouth and eye socket become pale and white, and there is often an abnormal amount of chalky deposit in the dung.

Post-mortem Appearances.—The wire-worm is only met with in the upper part of the stomach (see article "Notes on some diseases of the Ostrich," *Cape Agricultural Journal*, January, 1910), hence the difficulty of eradicating them. They are small and hair-like, and often require some searching for before they can be demonstrated. If the infestation is a bad one, the worms by their irritation cause the lining of the stomach to throw out a thick paste, like starch; this gives the stomach a curious appearance, sometimes called "*Vrot-Maag.*" In such a case this exudate must be scraped off before the worms can be demonstrated. It must be borne in mind that the gastric juice of the stomach rapidly dissolves the wire-worm once the bird is dead (and the parasite also), and a bird dead from wire-worm may not show a single parasite if the body is left lying overnight. I have demonstrated this several times thus: kill a bird badly infested with wire-worm, open the stomach sufficiently to demonstrate the presence of the parasite, then close up the stomach and return to the body in twelve hours; you will then be unable to demonstrate the presence of a single wire-worm in that bird's stomach.

One fact I have noticed, and ostrich men are of the same opinion, that a bird badly infested with wire-worm is very disinclined to eat mealies, and, if a bird goes off this kind of feed, that their presence must be suspected. Perhaps the digestion of mealies gives the bird pains under such conditions.

Treatment.—The doses of sal ammoniac and lime, with the preparatory doses of paraffin (to remove the coating from the stomach), have been printed in the *Cape Agricultural Journal*, and leaflets of the dosages can be obtained on application to the writer at the Veterinary Laboratory, Grahamstown.

The full details then published are as under:—

Preparatory Paraffin Dose.

6-weeks-old	birds	... ...	4 drms. or ½ oz.
2 months	,,	... ...	6 drms. or ¾ oz.
10 weeks	,,	... ...	8 drms. or 1 oz.
3 and 4 months	,,	... ...	2 oz.
6 ,,	,,	... ...	4 oz.
9 ,,	,,	... ...	6 oz.
12 ,,	,,	... ...	8 oz.
18 and 24 ,,	,,	... ...	12 oz.

Put the birds in a kraal in the early morning, keep without food all day; at night, say five p.m., give the dose of paraffin; still starve until next morning, and then give the lime and sal ammoniac:—

Four-months-old birds and under, as much as will lie on a shilling of each.

Six-months-old birds, a small teaspoonful of each.

Nine-months-old birds, a heaped teaspoonful of each.

Twelve-months-old birds, a half-ounce of each.

Full-grown birds, 1 oz. of each.

The small doses can be given in, say, 4 oz. of water each, and increased up to 13 or 15 oz. for the full-grown doses.

The lime does not dissolve, and must be given mixed with the water. I have two bottles with a dose in each and drench in quick succession, employing the usual precaution to avoid getting anything into the windpipe. I have given as much as 2 oz. each of lime and sal ammoniac, and though the bird certainly seemed distressed, it was more due to the mechanical evolution of ammonia gas than the chemical effect of the drugs. The effect of the medicine is very slight, and soon passes off.

After the doses of lime and sal ammoniac give the birds a few mealies or a little chopped greenstuff. Do not let them out into a field of lucerne or rape, else they are apt to over-gorge themselves after their fast.

The lime is ordinary slaked lime, which I pass through a sieve to remove stones, &c. This dose can be repeated in a fortnight.

If by accident an overdose of this sal ammoniac and lime is given, it will be well to give an ounce of whitening in a bottle of water.

Dosing Birds.

Though an ostrich has a neck and throat like a six-inch drain-pipe, he requires some care and precaution in dosing. The following remarks are not intended for the expert ostrich farmer (to whom I am indebted for most of my information on the subject), but to young beginners who are carrying out the "back to the land" axiom now the ostrich industry is yielding such a golden harvest.

When possible, always precede the wire-worm dose by some cleansing substance to remove the sticky covering (which pro-

tects the parasite) from the stomach walls. Petrol or paraffin are both good.

If possible, dose on an empty stomach; the drug loses much of its value when mixed with a stomachful of food.

Use a suitable bottle, varying with the size of the birds. I find a nice series to be—a castor-oil bottle, a small Van Riebeek bottle, and a long-necked Drakenstein bottle.

Tin bottles with an air-hole are on the market. I do not fancy them; the mouth gets rough and the finger slips from the air-hole, and one gets the drug over the face and clothes.

Stand in front of the bird, keeping clear of the legs; have a boy to each wing, and see they grasp the root of the wing and the body—I have seen a bird ruined by a wing becoming dislocated as the result of pulling on the tip. Then seize the bird's lower jaw with the left hand, shove the first, second, and third fingers over the opening of the windpipe in the floor of the mouth, the thumb being under the lower jaw. Slip the neck of the bottle over the fingers and well down the gullet, empty and withdraw the bottle, hold up the bird's head for a second or two, as some of them possess the power of inverting the beak and literally pouring the medicine out of the stomach, or rather the lower part of the gullet.

STATE EXAMINATION OF STALLIONS IN NEW ZEALAND.

A BILL is to be introduced by the New Zealand Government to provide for the compulsory examination of stallions. At the last Conference of the Agricultural and Pastoral Association, held in August, the following synopsis of the Bill was given to the delegates by the Chief Veterinarian (Dr. C. J. Reakes):—

"The Bill not to apply to stallions over two years old at the time it becomes law. Thus, when it is passed only those stallions which are one or two years old at the time would be subject to its operation; and, seeing that in practical working it is unnecessary to examine horses for hereditary unsoundness until they are three years old, time would be given to arrange the necessary machinery for carrying out the provision of the Bill before these animals reached the age of three years. Provision is made, however, for the owner of any animal over two

years old to voluntarily submit it to examination if he wishes. Thus a year after the Bill is passed all three-year-old horses will have to submit to examination; the following year these horses will again come up for examination as four-year-olds, together with the three-year-olds of that year; and a year later, three, four and five-year-olds will have to be examined, and so on. It is proposed that the licence shall have to be renewed yearly up to the age of six years, the horse being subjected to examination each time; that a licence granted at six years old shall remain current for two years, the horse being again submitted for examination at eight years of age; then the certificate of licence granted to eight-year-olds shall remain current for the rest of the animal's life, unless special circumstances should render it necessary to later call it up for further examination.

"Provision is made under which animals imported from Great Britain, Australia, or other countries may be examined before purchase by veterinarians especially appointed for the purpose, whose certificates will be accepted here as being equivalent to the certificates of New Zealand Government Veterinarians.

"All examinations in New Zealand are to be conducted by two Government Veterinarians acting in concert. Provision is also made for a right of appeal in the event of an owner being dissatisfied with the decision of the examining veterinarians. The schedule of diseases classed as being of an hereditary nature is as follows: Bone-spavin, ring-bone, side-bone, navicular arthritis, laryngeal muscular atrophy causing roaring or whistling during the act of inspiration, stringhalt, shivering, and an inferiority in the structure or quality of the hoof which impairs or is likely to impair the animal's usefulness, and is in the examiner's opinion transmissible to the progeny.

"I have a number of draught copies here of a suggested Bill which are at the disposal of delegates to this Conference, and I shall be pleased to receive any comments upon this, also any suggestions regarding it." This Bill, Mr. Reakes said in conclusion, he had endeavoured to make practical, and hoped that from the copies circulated delegates would have made themselves familiar with the proposed measure. The time had come when purchasers demanded that animals should be free from hereditary unsoundness.

A motion, "That it is desirable Mr. Reakes' Bill be passed this Session," was carried unanimously.

BOARD OF AGRICULTURE AND FISHERIES.

KING'S PREMIUMS AND SUPER-PREMIUMS FOR THOROUGHBRED STALLIONS FOR 1912.

ATTENTION is directed to the following important alterations in the premium regulations for the Show of Thoroughbred Stallions which is to be held in London on March 12, 13, and 14, 1912:—

(1) In lieu of a travelling fee of 10s. 6d. for each mare served a sum of 50 guineas will be paid to the stallion owner after the close of the season on production of a certificate that the stallion has regularly travelled the district for which it was awarded a premium.

Super-premiums.

(2) Super-premiums (*i.e.*, an award of 100 guineas in addition to the ordinary premium) will also be given to stallions of exceptional merit, but not more than ten will be awarded in 1912. The owner of a stallion is required to state in the entry form whether he enters his stallion for competition for a super-premium. If he does so enter it, he is to sign an undertaking agreeing to exhibit the stallion (if awarded a super-premium in 1912) at the Show of Premium Stallions in 1913 in a class for which it is eligible, in accordance with the regulations of the Board.

If he fails so to exhibit the stallion he is to forfeit and pay to the Board the value of the super-premium, *i.e.*, 100 guineas.

(3) Exhibitors may enter any number of stallions in each class, and may take all premiums awarded to them.

(4) The last day for entry is Monday, January 29, 1912, and for post entry Monday, February 5, 1912.

(5) Every stallion must be registered under the Board's registration scheme before it can be accepted for entry.

The registration year is November 1 to October 31, and re-registration will only be undertaken between November 1 and March 1.*

(6) A stallion will not be registered or retained on the register unless it is certified to be sound and suitable for breeding purposes, and is free from the following diseases and defects:—

* Application for the registration of stallions to be entered for 1912 show should be made not later than January 1, 1912.

Cataract, roaring, whistling, ringbone, sidebone, bone spavin, navicular disease, shivering, stringhalt, and defective genital organs.

(7) No veterinary examination will be made at the Show.

(8) A stallion to which a King's premium is awarded is to *travel* as the Board may direct, *i.e.*, no stallions will be allowed to *stand* in 1912.

Copies of the revised regulations for the registration of stallions can be obtained on application.

T. H. ELLIOTT,
Secretary.

TWO CASES OF HYDRONEPHROSIS IN THE DOG, CAUSED BY CARCINOMA OF THE BLADDER AND ACCOMPANIED BY PROSTATIC HYPERTROPHY.

Indexed B. A. L.

BY JOEST.

Case 1.—Ten-year-old St. Bernard dog died from urinary trouble. The left kidney is 12 cm. long at the hilus, 4.5 cm. broad, and 3.5 cm. thick; the right kidney is 11 cm. long, 3.5 cm. broad at the hilus, and 3.5 cm. thick. On palpation of both kidneys, but especially the right one, fluctuation could be detected at the hilus. The ureters are distended as thick as one's thumb throughout their whole extent and show intense fluctuation. The bladder is as large as a goose's egg and very hard. The tumour is situated on the dorsal bladder wall, and projects into its lumen, stretching from its summit to its neck and also meets the openings of the ureters. The mucous membrane of the bladder is rough, uneven and ulcerated. Urine from the ureters can hardly be pressed into the bladder. The prostate gland is enlarged and each lobe about the size of a pigeon's egg and of hard consistence. Histological examination of the tumour showed it to be an epithelial carcinoma.

Case 2.—A four-year-old setter dog had died. Inside the bladder in the dorsal wall there was a flat tumour half the size of a hazel nut, with an ulcerated surface. The bladder was empty and about the size of a hen's egg. The prostate was enlarged. Both ureters were distended as thick as one's little finger, and the kidneys were dropsical (hydronephrosis). Histological examination of the tumour showed it to be an adenocarcinoma.

In both cases the tumour obstructed passage of the urine from the kidneys to the bladder. The prostatic hypertrophy was a disease in itself.

(*From the Report of the Royal Veterinary College in Dresden*, 1910.)

Clinical Articles.

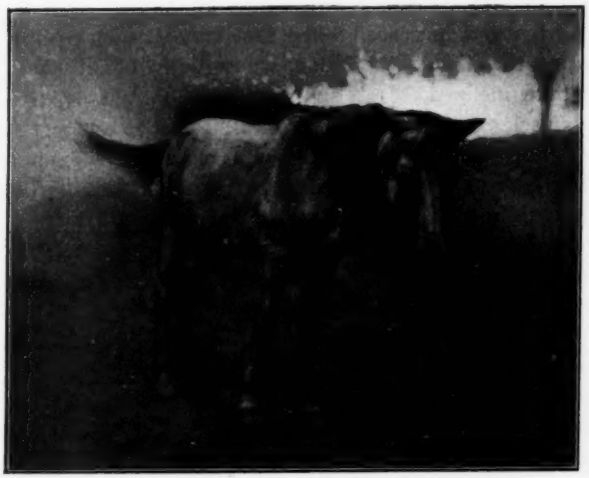
A CASE OF MELANOSIS IN THE HORSE.

By FRANK CHAMBERS, M.R.C.V.S.

Government Veterinary Surgeon, Umtata, South Africa.

During a visit in the district a few months ago I came across one of the most advanced cases of melanosis it has ever been my fortune to see.

The subject was a thirteen-year-old grey gelding in fairly good condition. The accompanying photograph gives a good idea of the enormous deposits of melanin in the various parts of the body. By far the greatest enlargements were in the parotid region on the off-side, the near-side being also affected. The



Photograph showing the position of the tumours.

presternal, precrural, popliteal and other glands were also affected. In fact, the horse appeared one mass of lumps. The owner was ignorant of the cause, and said that the condition had been gradually getting worse for six years. A special bridle had to be made for the horse on account of the enlargements at the base of the ears. The animal seemed in very good health, and did his work to the entire satisfaction of the owner.

A BRAIN CASE.

By Captain A. J. WILLIAMS, F.R.C.V.S., A.V.C.

Mounted Infantry School, Longmoor.

Subject.—A Mounted Infantry cob, age 14 years.

History, &c.—On December 28, 1909, the mare was suddenly taken ill whilst being led at exercise. There was marked staggering gait, and she was brought back to the stable with difficulty.

I found her leaning to the off side, resting aginst the stall partition, a slight frothy discharge from both nostrils, pupils normal, nervous expression. When moved there was marked inco-ordination of movements and an ataxic gait. The near fore was thrown out spasmodically, and the foot put to the ground in a peculiar feeling manner, as if uncertain of the distance; similar symptoms in the near hind.

All symptoms increased when first moved after a short rest; inclination to fall to the off side, worse when blindfolded; when reined back inclined to fall and staggered backwards, trembling of the muscles over the near shoulder. Pulse 60 and irregular.

December 29, 1909.—Paraplegic symptoms pronounced this morning. Plaits hind legs, ataxic gait and loss of co-ordination, especially marked when turning, nervous expression.

January 7, 1910.—Much improved, only slight paraplegic symptoms remain. Walking exercise for half-hour daily.

January 14, 1910.—Continues to improve. Exercise increased. On the 20th improvement maintained and exercise increased to two hours daily.

January 31, 1910.—Discharged cured.

Treatment.—A purgative was given when the case was admitted. Afterwards salines to correct any tendency to constipation. Pot. iod. 3j twice daily from time of admission till paraplegic symptoms disappeared.

Remarks.—The case was diagnosed as cerebral hæmorrhage, from the suddenness of the attack and the general symptoms, hemiplegia followed by paraplegia. The animal has remained perfectly fit since she was discharged, and has done regular work up to the present time.

IMPACTION OF COLON DUE TO ABDOMINAL ABSCESS, WITH RUPTURE AND DEATH.

By C. W. TOWNSEND, F.R.C.V.S.

Long Stanton.

The subject of the above note was a very good three-year-old Shire gelding, the property of a farmer.

I was called in to attend him one evening in November last; upon arrival I found the animal showing symptoms of abdominal pain. I diagnosed the case as one of impaction of the colon; examination *per rectum* verified my diagnosis. The usual treatment for this condition was adopted. The animal responded to treatment within the next twenty-four hours, by which time a fair amount of fæces had passed. As he appeared to be progressing favourably, I did not call again, but left word to send for me if required. Upon the third day from the first attack I was again requested to see the animal. Upon my arrival I found him exhibiting symptoms very similar to those shown during his first attack, but now of a more serious nature, viz., full quickened pulse, hurried breathing, temperature 105° F., injected visible mucous membranes, anxious expression, abdominal pain intense and persistent; no fæces had been seen since the morning. From the above symptoms I naturally concluded I had now something more than impaction of the colon to deal with.

Although I tried practically everything to alleviate the animal's suffering, death took place on the fifth day from the first attack.

Post-mortem Examination.—Upon cutting through the skin in the region of the scrotum, which latter appeared slightly swollen on the near side, I discovered a quantity of yellow inspissated pus.

Upon opening the abdominal cavity a quantity of pus was more or less mingled among the abdominal contents. On the same side as the swollen scrotum, at the entrance of the internal abdominal ring, I found upon examination the remains of a big abscess cavity with darkened walls, in the sac of which there was still some foul smelling pus.

Remarks.—I record this case not so much because of the

symptoms shown, but because of the result of the *post-mortem* examination.

During the first attack the animal showed no symptoms by which one could distinguish the case from that of an ordinary attack of impaction of the bowels. During the second attack it was practically impossible to correctly diagnose the case, as by the time I saw the animal it was more or less in a state of collapse.

The above case, to my mind, only shows the necessity for making *post-mortem* examinations whenever possible, and especially in those cases of so-called fatal colic. In the above case, no doubt, if a *post-mortem* examination had not been made, the cause of death would have been attributed to rupture or twisted bowel.

As to whether the pus was streptococcic or not I am unable to say, as, being very busy at the time, I was not able to microscopically examine it. I have frequently wondered, however, since the case happened, whether the abscess was the result of a previous attack of strangles; I could, however, find no history of this having previously occurred. The owner informed me, however, that the horse had not been doing well for some time previously.

As regards the abscess itself, no doubt its presence and the position it occupied accounted for the first attack of impaction; quite possibly during this attack the impaction pressed upon the abscess to such an extent that it caused the abscess to become suddenly enlarged, the rupture itself taking place during the second attack.

STERNAL FISTULA IN A HORSE.

By J. J. O'CONNOR, M.R.C.V.S.

Professor in the Royal Veterinary College of Ireland, Dublin.

Subject.—An aged brown trooper, in poor condition.

History and Symptoms.—A sinus of long standing abutting on the carinaform cartilage of the sternum, which did not respond to antiseptic irrigations.

Treatment.—On the same lines as the former case, and as a result of which the horse made a complete recovery.

SINUS IN THE LOWER JAW OF A HORSE.

By J. J. O'CONNOR, M.R.C.V.S.

Professor in the Royal Veterinary College of Ireland, Dublin.

Subject.—A six-year-old chestnut trooper.

History.—Had been affected for months with a sinus extending into the right horizontal ramus of the lower jaw for a distance of about 2 in. and opening on its lower edge (head horizontal). The condition resisted ordinary antiseptic treatment.

Treatment.—I cast and anæsthetized the horse, and incised the skin parallel to the long axis of the ramus for a short distance in front of and behind the orifice and reflected it from either side of the latter; vigorously curetted the lining of the sinus, until a large gaping opening was made in the bone; swabbed the wound with tinct. iodi. and plugged it with sterilized gauze, impregnated with pure iodoform powder. After treatment consisted in washing with antiseptic lotion made with sterilized water, swabbing with tinct. of iodine, and powdering with iodoform until the wound became uniformly covered with granulations, when the iodine was discontinued and mere dry dressing or astringents applied as seemed necessary. Recovery was uninterrupted, extending over a period of about two months.

TRACHEOCELE IN A HORSE.

By J. J. O'CONNOR, M.R.C.V.S.

Professor in the Royal Veterinary College of Ireland, Dublin.

Subject.—An aged high-class hunter.

History.—The horse had a tracheotomy tube in for the past twelve months, and recently he damaged the tube by rubbing it against the stable door, necessitating its being sent away to be repaired, another tube of a different, obsolete pattern being employed in the meantime. When the original tube was returned it was impossible to reinsert it owing to large cartilaginous granulations having formed inside the trachea, encroaching on the tracheal opening.

Treatment.—Cast the horse, applied cocaine over the granu-

lations, seized them with a sharp-pronged retractor, and removed them in slices with a sage knife, scraping away their bases with a curette. Still the tube (Jones's) could not be inserted, but on dilating the opening by means of a urethral dilator (used in urethrotomy in the horse), it was possible to insert it, tightly. Ordered the tube not to be taken out again. The horse hunted well during the season (1910-11) afterwards, and I have not heard anything about him recently.

A CASE OF CLEFT-PALATE IN A FOAL.

By JOHN JAMES RIDLEY, M.R.C.V.S.,

Beverley,

AND

FREDERICK HOBDAY, F.R.C.V.S.,

Kensington, W.

ALTHOUGH very commonly met with in the dog, the rarity of this condition in the horse tribe makes it worth while to put this case on record. The subject was a thoroughbred filly foal, worth, if normal, at least £500. The stud groom had observed shortly after birth that when the animal was sucking the mare the milk would return down the nostrils. She is now five months old, and the symptoms still persist, both fluid and semi-fluid food returning this way.

The patient is not in bad condition, as cod liver oil, Mellins' food, and various other nutriments have been given in addition to the best of food. An examination of the mouth revealed a cleft at the back of the mouth, about 1½ in. in length and mainly in the soft palate.

Treatment is at the present time impossible owing to the small space in which one can work to manipulate sutures, and it is doubtful, even if they could be inserted, whether they could be made to remain for a sufficient length of time to obtain permanent adhesion of the edges.

Canine Clinical Notes.

URETHRAL CALCULI IN A DOG.

By J. J. O'CONNOR, M.R.C.V.S.

Professor in the Royal Veterinary College of Ireland, Dublin.

Subject.—Aged collie in very poor condition. The dog had shown difficulty and pain in micturition for several weeks.

Symptoms.—Distressed appearance; passed urine in drops frequently; evinced pain on pressure over the prepubic region. Passed the catheter, which was arrested just behind the os penis.

Treatment.—Administered 1½ gr. morphia hypodermically. Exposed the penis from the sheath, opened the urethra just behind the os and extracted six small spherical calculi, corresponding in size to the diameter of the urethra. After their removal a flow of urine occurred from the bladder. The patient never rallied after the operation and died twenty-four hours afterwards. On *post-mortem* examination the bladder was found to be intensely inflamed.

NEEDLE AND THREAD IN THE RECTUM OF A PUG.

By J. J. O'CONNOR, M.R.C.V.S.

Professor in the Royal Veterinary College of Ireland, Dublin.

Subject.—A pug dog.

History.—A few days ago it was seen to swallow a needle and thread with which it was playing.

Symptoms.—Anxious expression, screaming occasionally from pain, passage of blood through the anus. On digital rectal examination a needle with thread attached could be felt about three-quarters of a finger's length in front of the anus, the point being directed backwards.

Treatment.—Brought the dog into the sunlight, dilated the anus and rectum with the equine urethral dilator, reflected the light into the rectum by means of a mirror, thus illuminating the foreign body, which was extracted by drawing on the thread to push the point through the mucous membrane, and then grasping the point with an artery forceps.

Abstract and Report.

OPENING OF THE ROYAL (DICK) VETERINARY COLLEGE.—INAUGURAL ADDRESS.

By Dr. CHARNOCK BRADLEY,

Principal.

Veterinary Science and its Relation to the Community.

The name and memory of William Dick, a native of this city, born in White Horse Close, will ever be held in reverence by the profession of which he formed so distinguished an ornament. To his penetrating foresight and indefatigable energy the genesis of this College is due. On his loyal and great-hearted generosity the continuance of the College after his death depended. Eighty-eight years ago Dick might have devoted his energies to the conduct of a private practice and the accumulation of wealth. Fortunately for veterinary science his was a more altruistic character. Instead of working for his own gain merely, he followed the advice of Dr. John Barclay, and, in a humble way, laid the foundation of the first veterinary school in Scotland. Of what the germ of his school was like we can form some idea from the words of one who wrote as an eye-witness. "You may fancy to yourself," says the writer, "a room of no very great dimensions in an old and apparently long untenanted house in Clyde Street. You enter it from the street door and are immediately struck with the delightful confusion which seems to reign within. Skeletons of all descriptions, from a horse to an ape, not ranged in regular order 'all of a row,' but standing higgledy-piggledy, their ranks having been broken by the Professor's table, and their heads looking in all directions, as if thrown together by chance. . . . Of that portion of the house which is set apart for the audience, the best thing I can say is that whenever I dropped in I have always found it remarkably well filled. It is fitted up with rough deal planks, set upon rough props, the seats rising tier above tier until your head touches the top of a dark-coloured ceiling."

From this modest beginning the College grew and grew rapidly. Extension after extension was made; elaboration after elaboration became necessary. In the beginning Dick was unassisted, but ultimately he was forced to gather around him a staff of teachers, some of whom later became famous in the veterinary and wider scientific world.

I think that without the slightest exaggeration or distortion of fact, we may say that as Dick's College grew, so came into being a veterinary profession in Scotland, and the growth of the two was inter-dependent. When the veterinary school was first projected a veterinary profession could scarcely be said to exist on this side of the border. We are told that at that time

there were not more than a dozen practitioners in Scotland, with the result that animal owners were almost entirely at the mercy of charlatans and quacks of the most ignorant description. With the dissemination of veterinary knowledge resulting from the establishment of the Clyde Street School, properly qualified practitioners became increasingly numerous and of vastly improved training. The rule-of-thumb man gradually—unquestionably very gradually—gave place to him who was equipped to take a more scientific and more common-sense view of the causes and treatment of animal diseases.

When William Dick died in 1866, "in the full tide of successful experiment," he had stamped upon veterinary science so indelible an impression, that the good work he had initiated continued and became ever more and more fruitful.

Veterinary science, not only in Scotland, but in the United Kingdom, and throughout the whole civilized world, has benefited by the movement which had its origin in the "old and apparently long untenanted house in Clyde Street." It was said during Dick's lifetime, and has been said since his death, that the Clyde Street School catered for the requirements of Scotland only. This is not, and never has been, according to fact. While Dick was still living 818 students graduated from this College, and of these barely more than half belonged to Scotland. A large proportion came from England and Wales, some from Ireland, and others from the Colonies and from foreign countries. Clearly the Edinburgh Veterinary College in those days was not parochial. What was true from 1823 to 1866 remains true to-day. Into the uttermost parts of the earth, beyond the confines of the seven seas, men have gone forth from the narrow and somewhat gloomy street where for all but ninety years the school has been located. Not long ago it was possible to say that the principals of all the veterinary colleges in the United Kingdom could claim the Clyde Street School as their Alma Mater, as can at the present moment the heads of the schools in London, Glasgow, Dublin, and Sydney. Not only in Scotland are graduates of this College practising their profession, but an examination of the Official Register of Veterinary Surgeons shows that practitioners trained within these walls are doing their work and maintaining the traditions of the school in every county of England, in every county but one in Wales, and in every county but three in Ireland. They are found in nearly all the King's Dominions beyond the seas. They may be met in many of the States of North America and in South America.

To give a list of famous men who have sat on the benches within this College would be tedious from its length. Let it suffice to say that former students have occupied and are occupying the most exalted positions in their profession. Almost as tedious would it be to recount the names of famous men who have been teachers in this school. Taking merely a few who have attained world-wide repute, and avoiding the perils attendant upon an assessment of their eminence, the roll contains the

names of Sir James Dewar, Fullerian Professor of Chemistry, Royal Institution; Sir John McFadyean, Principal of the Royal Veterinary College, London; James McCall, Principal of the Veterinary College, Glasgow; A. E. Mettam, Principal of the Royal Veterinary College of Ireland; Stewart Stockman, Head of the Veterinary Department of the Board of Agriculture and Fisheries; Daniel John Cunningham, the much-lamented late Professor of Anatomy in the University of Edinburgh; J. G. McKendrick, Emeritus Professor of Physiology in the University of Glasgow; Isaac Bayley Balfour, Professor of Botany, University of Edinburgh; James Arthur Thomson, Professor of Natural History in the University of Aberdeen. These, as well as other men of eminence, have helped to make the school what it is, and have influenced, and been influenced by, the traditions of the Institution.

Were we asked to state adequately but briefly what veterinary science has done since the time William Dick first entered Clyde Street as a teacher, we should find the task one of great difficulty, and of difficulty because of a richness of material. Beyond question veterinary science has performed a humanitarian function of surpassing moment in that it has rescued animals from the rough and ready, and even barbarous, treatment to which they, when ailing, were subjected during the earlier part —nay, even during a later part—of the nineteenth century. An examination of the tattered manuscript books which it was, and possibly still is, the custom to hand down from father to son among farmers, village smiths, and country quacks, produces a feeling of wonder that animals could survive the treatment to which they were subjected, and the weird and loathsome decoctions with which they were drenched. Unquestionably the growth and development of veterinary science has resulted in a more humane, and therefore more efficacious, mode of treatment.

Descending from the humanitarian to the utilitarian standpoint, it can be claimed without hesitation that veterinary science has been of inestimable benefit to the community. In how far the wealth of the country has been, and is being, conserved, cannot be definitely computed, but a very useful method of attaining an approximation is the examination of published statistical tables, showing the prevalence of contagious diseases, and the loss of animal life arising therefrom, during the past thirty or forty years.

The recent outbreaks of foot-and-mouth disease caused a certain amount of commotion amongst stock-keepers, and trade was in a degree affected. What must have been the result of the 18,732 outbreaks in 1883, when no fewer than 461,145 animals of various kinds were attacked! And what the dislocation of trade when in February of that year, all the country markets were closed for a month. Contrast the isolated and, nowadays, infrequent appearances of the disease in the United Kingdom with the returns as given for Continental countries. On June 15, in Germany alone, there were no fewer than 16,504 infected places. Holland had 4,602 outbreaks during the month of Mav. In Italy 25,004 animals were affected during the week

ending April 30, and in Russia there were 58,274 cases in the month of February. By contrast the returns made by our own Board of Agriculture pale into almost absolute insignificance. Nevertheless, it cannot be forgotten that a severe outbreak of foot-and-mouth disease would be a very serious thing. Recently Sir Edward Strachey (now Lord Strachie) has, in public utterance, pointed out that not only would there be great loss to the agriculturist, but the general public would suffer enormously because of the shortage of milk. This possibility makes it incumbent upon the State to encourage, if not institute, detailed investigation of the cause, and mode of transmission of, and possibility of complete protection from, the disease.

The Annual Reports of the Board of Agriculture afford abundant evidence of the saving of animal life from other contagious diseases, and the consequent prevention of monetary loss to the country.

Cattle plague, which on more occasions than one has produced the wholesale decimation of herds, has been unknown since 1877. In 1891 9,491 cattle were slaughtered on account of 192 outbreaks of pleuro-pneumonia. This disease has not been known in this country since 1898, whereas from 1891 to 1898 inclusive nearly 16,000 animals were destroyed.

Thanks to efficient steps having been taken, rabies—the very name brings terror—has ceased to exist in this country.

Sheep-scab, which formerly caused so much loss to sheep-owners, is steadily declining, so that last year there were only 556 outbreaks as compared with 1,939 eleven years ago, and 3,092 sixteen years ago.

Glanders, a disease to be feared by man because of its capacity of transmission from animals to the human subject, has also shown a steady decrease during recent years.

The only serious animal diseases which have not as yet been materially affected by preventive measures are anthrax and swine fever. These have offered problems difficult of solution, but there is no reason to despair of the ultimate reading of the riddle. Other diseases have prevailed for a time, but scientific investigation and the application of knowledge arising therefrom have ultimately resulted in their subjection. There is much to be hoped for in inoculation and serum-therapy.

While speaking of contagious diseases it is perhaps not entirely beside the point to make reference to certain facts relative to diseases among animals in more distant parts of the Empire. As will be readily admitted the presence of contagious animal disease is a potent factor against the spread of civilization and the development of the resources of our Colonies. Clearly man cannot establish himself permanently and satisfactorily in any part of the world without domestic animals. Man situated in those regions where animals survive with difficulty is, therefore, seriously handicapped. This is the case in certain parts of Africa. I have been informed recently that during thirteen months some 44,000 cattle have died in one single district from East Coast fever. Translate these figures

into pounds, shillings and pence, and we appreciate something of the troubles of the African stock-keeper. It is scarcely necessary to say that the authorities are quite alive to the fact that this state of things and the proper development of the country are not compatible. A properly organized staff of scientific workers is dealing with this and similar diseases, and on that staff graduates of the Dick Veterinary College are extensively represented. Report has it that there is great probability that a means of dealing with East Coast fever will soon be at hand. When this is accomplished the Dick Veterinary College will doubtless shine by reflected glory, for one of our graduates is at present pursuing a very promising line of investigation.

With the help of statistical tables which are readily available it is easy to show the decrease in contagious diseases. The prevalence or otherwise of non-specific disease is not so easy of demonstration. It is beyond doubt, however, that veterinary science, by disseminating knowledge regarding the maintenance of hygienic conditions is doing much to lessen the more common ailments of farm and other animals. Agricultural science has done a very great deal to reform the methods of the farmer. The tiller of the soil has now only himself to blame if he follows the haphazard and unsatisfactory procedures of his forefathers and reaps accordingly. But in the improvement of agriculture veterinary science can claim a share. The housing and feeding of animals has been studied not only from the purely scientific but also from the economic point of view. It has been demonstrated that there is a right and a wrong way of regarding the animal machine from the point of view of the economist.

In a further very important direction also science is helping agriculture. Breeding is being slowly raised from a process in which chance played the greater part to one in which there may be much certainty. The immortal if muddle-headed Mr. Tulliver was doubtless voicing the impression of most if not all his contemporaries when he said: "That's the worst on't wi' the crossing o' breeds; you can never justly calkilate what'll come on't." Without wishing to arrogate to science more than is her due, and while admitting that scarcely more than the fringe of the subject has been touched, it may be claimed that the very juvenile science of genetics has already justified its existence, and will, beyond doubt, be of inestimable assistance to the breeder of the future. There can be little doubt that, at no very distant time, it may be possible to "justly calkilate what'll come on't" when certain breeds and individuals are crossed.

The conviction that medical science, veterinary no less than human, must of necessity step aside from its purely curative function and give due regard to preventive measures, is of no new origin. For long it has been felt that preventive medicine had a great future before it, and it is becoming daily more evident that the conviction was well founded. Preventable disease is decreasing, and, with the more general adoption of hygienic measures, it is safe to prophesy, will continue to de-

crease. The study of the principles of immunity and their application also makes for prevention in no trifling degree.

When disease does effect a lodgment modern therapeutics—not forgetting serum therapy—constitutes a powerful weapon whereby the practitioner may stay its ravages. Without doubt the veterinary surgeon of to-day is more fortunate in his equipment than were his predecessors, and not least so in the possession of medicaments unknown to those who went before him, which have received such attention at the hands of investigators as has removed their use from the realm of empiricism.

In the immediate future, even more than in the present, it will be necessary for the veterinary profession to take a large share in the work of that organization which has been evolved for the preservation of the health of the people considered as a community. During recent years it has become more and more apparent that the veterinary officer has a function in public health administration scarcely less important than that of the medical officer. It is clear that the health of the community is constantly menaced by danger of a double origin. Not only may disease and death have a human source: there is an animal source as well. Some diseases such as glanders and anthrax may be conveyed from animals to man by accidental inoculation. Other specific diseases, such as tuberculosis, may be transmitted to the human subject by the consumption of unsound meat and milk. From his knowledge of all the phases of disease in animals, no one is better fitted than the veterinary surgeon to assist in the safeguarding of man from disease of animal origin.

In most large towns—shall we say in towns blessed with enlightened authorities?—there is a staff of efficient and specially trained veterinary officials. The value of their services cannot be put into figures, but in a town like Edinburgh we can say that it is through the instrumentality of highly competent veterinary inspectors that we eat sound meat and drink wholesome milk.

The day is not far distant when veterinary public health officers will form a very considerable proportion of the profession. That these men must continue and amplify the work they have been doing for some time past has been emphasized by the recently published final Report of the Royal Commission on Tuberculosis. In 1901 a Royal Commission was appointed in order that three questions regarding tuberculosis might be answered if possible. One of the questions was whether the disease in animals and man is one and the same. This has been answered in the affirmative, as has also the question whether animals and man can be reciprocally infected with it. Of the three questions the third is of supreme importance from a public health point of view, and was stated in these terms: Under what conditions, if at all, the transmission of tuberculosis from animals to man takes place, and what are the circumstances favourable or unfavourable to such transmission? The Report of the Commission, upon which sat one of the most eminent members of the veterinary profession, a graduate of the Dick College, may be allowed to

answer the question largely in its own words: "Only rarely has a pulmonary lesion in adult man yielded the bovine bacillus." But "our experience of abdominal tuberculosis in the human subject has been very different, especially as regards children. Of young children dying from primary abdominal tuberculosis, the fatal lesions could in nearly one-half of the cases be referred to the bovine bacillus, and to that type alone. In children, too, and often also in adolescents, suffering from cervical gland tuberculosis, a large proportion of the cases examined by us could be referred to the bovine tubercle bacillus." "Whatever, therefore, may be the animal source of tuberculosis in adolescents and in adult man, there can be no doubt that a considerable proportion of the tuberculosis affecting children is of bovine origin, more particularly that which affects primarily the abdominal organs and the cervical glands. And further, there can be no doubt that primary abdominal tuberculosis as well as tuberculosis of the cervical glands is commonly due to ingestion of tuberculous infective material." "The evidence which we have accumulated goes to demonstrate that a considerable amount of the tuberculosis of childhood is to be ascribed to infection with bacilli of the bovine type transmitted to children in meals consisting largely of the milk of the cow." "But it must be remembered that we have found cases of tuberculosis in adult man, sufficiently extensive to incapacitate the patient from the ordinary duties of life, and in two instances ending fatally, in which we were able to attribute the disease solely to the effect of the bovine tubercle bacillus."

The extent of these quotations is justified by the imperative necessity that the public and public authorities should be informed, on every possible occasion, of the momentous conclusions arrived at by a body of scientific men who have devoted their energies to the matter for the past ten years. With no uncertain voice have they made it clear that the services of the veterinary surgeon are needed, and urgently needed, in order that that much and naturally dreaded disease, tuberculosis, may be exterminated. For the sake of the children alone, if not also for the sake of adolescents and adults, tuberculosis in animals must cease to exist; and in the work of bringing about this eminently desirable state of affairs the veterinary officer of health, as well as the veterinary surgeon in general, must take a part. One more quotation from the Commission's Report: "In the interests, therefore, of infants and children, the members of the population whom we have proved to be especially endangered, and for the reasonable safeguarding of the public health generally, we would urge that existing regulations and supervision of milk production and meat preparation be not relaxed; that, on the contrary, Government should cause to be enforced throughout the Kingdom food regulations planned to afford better security against the infection of human beings through the medium of articles of diet derived from tuberculosis animals."

In view of the fact that fresh fields of activity are opening up for the veterinary surgeon both at home and abroad, no

effort must be spared to keep the veterinary schools abreast of modern requirements, or, rather, one should say that the schools must be ahead of present needs in order that there may be a suitable margin of preparedness for subsequent developments. The present is a momentous period in the history of veterinary science in general, and in Scotland in particular. The next few years, it is confidently expected, will see such changes as will render it certain that the Dick College will advance in its position as one of the leading veterinary schools of Europe. The governing authorities are alive to the fact that the modern veterinary graduate must have had a very different training from that received by his predecessors. Not only must he possess a first-hand knowledge of the more ordinary branches of his profession: he must be prepared to enter the ranks of those specialists who are so rapidly increasing in numbers. The graduate must not be content to have been spoon-fed by his teachers. He must have seen things for himself, *i.e.*, he must have done practical work in the laboratories and in the hospital, in the stable, the byre and the kennel. He must know something of veterinary public health administration. He must, in short, be ready with a substantial foundation upon which to erect a superstructure of knowledge for utilization in his work as a general practitioner, a member of the Army Veterinary Service, a public official either at home or abroad.

This means that the veterinary schools must expand their accommodation and equipment: must not relax to any degree their efforts to provide their students with a sound preliminary professional grounding; must be in a position to meet future calls upon their resources.

In addition it must not be forgotten that to the schools look the practitioner, the animal owner, the agriculturist, and the general public for those additions to knowledge which shall make for increased efficiency of the professional man, which shall produce diminution of animal diseases, and which shall ensure greater safety of the community from diseases and dangers of animal origin. Great though the recent advances of science may have been and many the secrets which have been probed, there is no fear that the scientist will imitate Dr. Busby and decline to remove his hat in the presence of the King for fear that the bystanders may not note what a great man he is. That which has been done merely serves to give some feeble indication of how much remains to be done, and engenders a feeling of humility rather than pride. There can be no resting on our oars. We must pull towards the light. The schools, therefore, in addition to being places where students are trained, must also be in a position to give habitation and encouragement to those who are prepared to devote their time and energies to the elucidation of problems, the solution of which can but be of benefit to their fellow men.

TRYPANOSOME DISEASES OF DOMESTIC ANIMALS IN UGANDA.*

By Colonel Sir DAVID BRUCE, C.B., F.R.S.,
Captains A. E. HAMERTON, D.S.O., and H. R. BATEMAN,
Royal Army Medical Corps,
and
Captain F. P. MACKIE,
Indian Medical Service.

Indexed B. A. I.

Synonyms.

Trypanosoma dimorphon (Dutton and Todd).
Trypanosoma congolense (Broden).
Trypanosoma confusum (Montgomery and Kinghorn).
Dr. Edington's trypanosome from Zanzibar (Bruce, Hamerton and Bateman).
Trypanosome from Chai-Chai, Zambesi, Zululand (Theiler).
Trypanosome from Southern Rhodesia (Bevan).

Introduction.

As might be expected from the tropical nature of the country, Uganda suffers much from protozoal diseases, and as the wealth of the natives consists principally in cattle, goats, and sheep—the king and chiefs having huge herds—there is much loss.

To give an idea of the enormous mortality which must take place among the herds of cattle in Uganda, Sir Apolo Kagwa, K.C.M.G., the Prime Minister, may be quoted. He informed the Commission that during 1908 he had 1,396 cows, which had 2,021 calves, and of these calves 709 died—35 per cent. Further, of cows, bulls, and full-grown bullocks, there had died 351. This makes a total of 1,060 deaths in one year. The number of the whole herd is not given, but may be put down at 4,000. This means a yearly death-roll of about 25 per cent. During the same year the Government Transport Department in Entebbe lost 156 oxen between June and November.

During 1909 the Commission had the opportunity of investigating several outbreaks of trypanosome disease among domestic animals, one among the transport cattle at Entebbe (lat. 0° 3′ N., long. 32° 30′ E.); another at Kampala (lat. 0° 18′ N., long. 32° 35′ E.); a third at the Uganda Company's estate at Namukekera (lat. 0° 40′ N., long. 32° 17′ E.); a fourth at Mr. Walsh's farm at Kabula Muliro, a few miles west of Namukekera; and a fifth at the Mabira Rubber Estate (lat. 1° 50′ N., long. 32° 40′ E.).

The commonest trypanosome disease among cattle in Uganda is caused by a trypanosome of the *dimorphon* type, which it is proposed to call *Trypanosoma pecorum*. This species is probably the same as that which has been known by the name

* Reprinted from the *Proceedings of the Royal Society*, B, vol. 82.

T. dimorphon (Dutton and Todd), and is either identical with, or very similar to, Broden's *T. congolense*. The name *dimorphon* is a misleading one, and can only be accounted for by Dutton and Todd describing under one name two species of trypanosomes occurring in the same animal. No one, so far as we are aware, has re-discovered Dutton and Todd's *T. dimorphon*, although many attempts to reconcile later observations with theirs have been made. Certainly the strain kept at the Liverpool School of Tropical Medicine under that name does not agree with the original description. The term *T. dimorphon* must therefore disappear, since it was born of a misapprehension. But it will at once be said, if the name *T. dimorphon* must go, why not call the species *T. congolense?* The only reasons that can be given are, that *T. congolense* is a local name, and, therefore, not very suitable; and secondly, that if it comes to strict priority, then *T. dimorphon* holds the field in spite of its misleading character and the error its authors fell into, because it cannot be denied that there is a strong feeling that *T. dimorphon* and *T. congolense* are one. At the same time, it must also be granted that there are others who are strongly of opinion that *T. dimorphon* and *T. congolense* are distinct species. Under these circumstances it seems best to unite the old names under a new one, and *T. pecorum* seems appropriate enough, as this trypanosome disease is peculiarly one of herds. Montgomery and Kinghorn have lately proposed the name *confusum*, in order to get out of the difficulty; but this name has been used for a trypanosome already, and it is, moreover, an awkward term.

It must then be understood that in the species *T. pecorum* we include *T. dimorphon*, *T. congolense*, the trypanosome discovered in Zanzibar by Edington and described in the *Proceedings*,* that from Portuguese East Africa and Zululand described by Theiler, and the species found in Northern Rhodesia by Montgomery and Kinghorn, and in Southern Rhodesia by Bevan.

The other species of trypanosomes found in the blood of cattle in Uganda were *T. gambiense*, *T. brucei*, *T. vivax*, *T. cazalboui*, and *T. nanum*. These names, however, may require to be reconsidered.

Distribution in Uganda.

Cattle suffering from *T. pecorum* were sent to the Sleeping Sickness Commission's laboratory at Mpumu from Entebbe, Kampala, Namukekera, Kabula Muliro, and Mabira. It is probably widely distributed throughout Uganda. It was also found in a horse which had arrived in Nairobi, British East Africa, from Abyssinia. The Commission is indebted to Mr. Stordy, Principal Veterinary Officer, for the opportunity of studying this trypanosome. It is not known where the horse became infected, but it must have been at some point between Nairobi and the Abyssinian border.

* B, vol. 81, p. 14.

Morphology of *Trypanosoma pecorum.*

(A) *Living, Unstained.*

This trypanosome, when observed in a preparation of fresh blood, is seen to remain at or near the same spot in the field—that is to say, it is non-translatory. It is, however, active and restless, the body quivering rapidly, and the undulating membrane and flagellum keeping up a constant vibratory motion. As a rule, it moves with the flagellar end in front. The contents of the cell are homogeneous, except for a vacuole at the posterior extremity.

A marked characteristic of this species is that it exhibits alternating periods of quiescence and activity. When quiescent it is usually invisible, as it has a habit of burying itself under small collections of red blood corpuscles.

(B) *Fixed and Stained.*

Method of Staining.—Giemsa's method, as described in a former paper,* was used.

Length.—The same method of measuring was used as described in the same paper.

Breadth.—Without the undulating membrane the average is about 2 microns; with the membrane, about 3 microns.

Shape.—This trypanosome, when stained, is short and stout in form. The posterior extremity is blunt, or rounded, or pointed

TABLE I.—*Trypanosoma pecorum.*

No. of experiment	Animal	Day of disease	Method of fixing and staining	In Microns		
				Average length	Maximum length	Minimum length
82	Ox	...	Osmic vapour and Giemsa	11.7	14.0	10.0
505	,,	42	,,	12.3	15.0	10.0
	,,	...	,,	13.2	15.0	11.0
593	Sheep	50	,,	14.5	17.0	10.0
44	Monkey	31	,,	12.2	14.0	10.0
559	,,	14	,,	12.7	16.0	11.0
461	Dog	44	,,	15.3	18.0	13.0
543	,,	10	,,	14.3	16.0	11.0
1,406	,,	31	,,	13.7	16.0	11.0
551	Rat	19	,,	12.6	18.0	8.0
626	,,	...	,,	12.8	15.0	10.0
398	Mouse	28	,,	14.6	16.0	13.0
398	,,	36	,,	13.1	17.0	10.0
			Average ...	13.3	16.0	10.6

* *Roy. Soc. Proc.*, B, vol. 81, p. 16.

and angular. The anterior end is narrower. The undulating membrane is fairly well developed, more so, perhaps, than in *T. nanum*. The flagellum arises near the micronucleus, and passes along the edge of the undulating membrane. There is no free flagellum.

Contents of Cell.—Generally homogeneous. Sometimes granules are seen which take on a chromatin stain, and are situated anterior to the nucleus.

Nucleus.—Is oval in shape, and situated about the middle of the body.

Micronucleus.—Small and round, and situated near to, but not at, the posterior extremity.

Undulating Membrane.—Is simple, but fairly well developed.

Flagellum.—There is no free flagellum. In very rare cases, where there is an appearance of a free flagellum, the trypanosome will be found to be dividing.

As will be seen from this tabulated statement, the disease set up in domestic animals by *T. pecorum* is a serious and fatal one.

Cattle, goats, sheep, monkeys, dogs, rats, and mice are susceptible. Guinea-pigs, on the other hand, are refractory. Horses, mules, donkeys, and rabbits were not available at Mpumu; so that, unfortunately, it is not possible to say whether they are inoculable or not. In regard to guinea-pigs, it would be interesting to know whether a series of inoculations into rats or rabbits would make the *T. pecorum* also pathogenic for them.

Theiler describes a trypanosome from Chai-Chai, near the mouth of the Limpopo, in Portuguese East Africa, from the mouth of the Zambesi, and also from Zululand, which resembles the one under discussion, in not infecting guinea-pigs, and considers that this one fact is sufficient for the creation of a new species. We cannot agree with him in this, as there is no practical importance, except in the laboratory, in the fact that the guinea-pig is insusceptible, and, moreover, until more experiments have been made, we cannot be sure that under certain conditions of dosage or passage through the smaller animals the guinea-pig will remain refractory.

The important facts in regard to this species are, that man is not susceptible, but that the valuable domestic animals are, and that in these animals the disease is, as a rule, a fatal one.

As long as our knowledge of trypanosomes is limited, it seems better to group them under as few names as possible. As knowledge grows, and as fundamental differences emerge, then it will be time to define them more strictly. As far as our present knowledge goes, the morphology of *T. dimorphon*, *T. congolense*, the Uganda, Zanzibar, Chai-Chai, Zambesi, Zululand, and Rhodesian strains is identical; these trypanosomes affect the same important domestic animals; the carrier is probably or may be the same, though this is not known, and therefore these various forms should, for the present, be grouped under one name, and for certain reasons given above we propose the name *T. pecorum* for this group.

TABLE II.—ANIMALS SUSCEPTIBLE TO *Trypanosoma pecorum*.

No. of experiment	Source of virus	Period of incubation, in days	Duration of disease, in days*	Remarks
	Cattle.			
82	Natural infection	?	2	Died 2 days after arrival
110	,, ,,	?	243	Treated with lithium antimonyl tartrate.
230	,, ,,	?	4	Died 4 days after arrival.
357	,, ,,	?	3	,, 3 ,, ,,
358	,, ,,	?	1	,, 1 day after arrival.
359	,, ,,	?	60	Treated with arsacetin.
360	,, ,,	?	14	Died of *Trypanosoma pecorum*.
391	,, ,,	?	313	,, ,,
475	,, ,,	?	9	Died 9 days after arrival.
476	,, ,,	?	2	,, 2 ,, ,,
477	,, ,,	?	13	,, 13 ,, ,,
482	,, ,,	?	5	,, 5 ,, ,,
483	,, ,,	?	34	,, 34 ,, ,,
505	,, ,,	?	265	Killed.
550	,, ,,	?	—	Treated with arsenic; still alive after 254 days.
1459	,, ,,	?	43	Died 43 days after arrival.
1560	,, ,,	?	46	,, 46 ,, ,,
1731	,, ,,	?	79	Killed.
1733	,, ,,	?	76	Died 76 days after arrival.
1735	,, ,,	?	79	Killed.
1736	,, ,,	?	79	,,
1737	,, ,,	?	84	Died of *T. pecorum*.
97	Ox	9	46	,, ,,
447	,, ...	8	287	Killed.
1463	,, ...	7	35	Died of *T. pecorum*.
1464	,, ...	7	14	,, ,,
1225	Monkey ...	—	—	Died 8 days after inoculation; bitten by snake. Never showed trypanosomes.
1357	Dog	6	15	Died of *T. pecorum*.
1358	,, ...	6	18	,, ,,
1359	,, ...	6	22	,, ,,
1363	,, ...	6	15	,, ,,
1364	,, ...	6	38	,, ,,
1365	,, ...	6	29	,, ,,
	Average ...	6.7	63	
	Goat.			
1005	Ox	—	—	Never showed trypanosomes; still alive after 72 days.
1006	,, ...	14	44	Cause of death doubtful.
1404	,, ...	9	41	,, ,, ,,
1405	,, ...	—	—	Never showed trypanosomes; under observation 31 days.
633	Monkey ...	12	51	Cause of death doubtful.
	Average ...	11.6	45	

* Duration includes the days of incubation; it dates from the day of infection.

TABLE II.—ANIMALS SUSCEPTIBLE TO *Trypanosoma pecorum*.—*Continued.*

No. of experiment	Source of virus	Period of incubation, in days	Duration of disease, in days*	Remarks
	Sheep.			
697	Ox	21	—	Still alive after 170 days.
632	Monkey ...	8	43	Cause of death doubtful.
593	Dog	19	168	Died of *Trypanosoma pecorum*.
	Average ...	16	105	
	Monkey.			
44	Ox	14	35	Died of *T. pecorum*.
49	,, ...	10	16	,, ,,
376	,, ...	11	56	,, ,,
683	,, ...	10	61	,, ,,
1740	,, ...	11	—	Still alive after 45 days.
719	Sheep	21	—	,, ,, 216 ,,
350	Monkey ...	10	181	Died of *T. pecorum*.
459	,, ..	6	80	,, ,,
1000	,, ...	16	45	,, ,,
460	Dog	11	75	Killed for cultivation experiments.
559	,, ...	12	39	Died of *T. pecorum*.
560	,, ...	14	32	,, ,,
581	Rat	13	86	,, ,,
	Average ...	12.3	64	
	Dog.			
543	Horse	9	26	Died of *T. pecorum*.
148	Ox	10	46	,, ,,
349	,, ...	22	91	,, ,,
552	,, ...	—	—	Re-injected after 17 days.
1007	,, ...	—	—	Found dead after 14 days.
1406	,, ...	21	29	Killed.
1407	,, ...	—	—	Died; under observation 31 days.
1193	Monkey ...	8	16	Died of *T. pecorum*.
433	Dog	7	44	,, ,,
434	,, ...	9	58	,, ,,
461	,, ...	6	40	,, ,,
1544	,, ...	10	21	,, ,,
552	Rat	—	—	Still alive after 49 days.
	Average ...	11.3	42	
	Guinea-pig.			
685	Ox	—	—	Still alive after 96 days.
1162	,, ...	—	—	,, ,, 36 ,,
1163	,, ...	—	—	,, ,, 36 ,,
1164	,, ...	—	—	,, ,, 36 ,,
1647	,, ...	—	—	Died; under observation 29 days.
628	Monkey ...	—	—	Still alive after 104 days.
1002	,, ...	—	—	,, ,, 50 ,,
566	Dog	—	—	,, ,, 78 ,,

* Duration includes the days of incubation; it dates from the day of infection.

TABLE II.—ANIMALS SUSCEPTIBLE TO *Trypanosoma pecorum.—Continued.*

No. of experiment	Source of virus	Period of incubation, in days	Duration of disease, in days*	Remarks
		White rat.		
397	Ox	17	39	Died of *T. pecorum.*
551	,, ...	16	18	Killed for cultivation experiments.
684	,, ...	16	32	Died of *T. pecorum.*
699	,, ...	—	—	Experiment stopped after 57 days.
1646	,, ...	12	16	Died of *T. pecorum.*
626	Monkey ...	12	22	Killed for cultivation experiments.
1001	,, ...	13	23	Died of *T. pecorum.*
455	Rat	9	12	,, ,,
729	,, ...	11	21	,, ,,
1708	,, ...	8	12	,, ,,
	Average ...	12.6	21	
		Mouse.		
686	Ox	—	—	Experiment stopped after 59 days.
398	Monkey ...	26	41	Died of *T. pecorum.*
627	,, ...	12	26	,, ,,
454	Mouse	6	12	,, ,,
	Average ...	14.7	26	

* Duration includes the days of incubation ; it dates from the day of infection.

Disease set up in Cattle by Trypanosoma pecorum.

It is unnecessary in this paper to describe in detail the symptoms which can be noted during life, or the pathological changes set up in the organs of cattle by this trypanosome. It will be sufficient to say that the main symptoms are emaciation, anæmia, and progressive weakness, and that the principal *post-mortem* appearances are those due to anæmia.

Incubation.—As is probably true of most trypanosome diseases in susceptible animals, the period of time which elapses between the infection of the animal and the appearance of the trypanosomes in sufficient numbers in the peripheral blood to be seen by the microscope is a short one, in this case an average of 6.7 days.

Duration.—Of the course and duration of this disease in cattle little, unfortunately, is known. Most of the cattle which came under observation at the laboratory of the Commission at Mpumu were already sick when they arrived, and it was, as a rule, impossible to know when they had been infected. By referring to the table, it will be seen that twenty-two naturally-infected cattle were under observation. Four of them lived, on an average, nine months. Of these four, one, treated with arsenic, was still alive and apparently healthy in December, 1909, one was killed, one had been treated with lithium antimonyl tartrate, and one died without treatment at the end of 313 days. It is therefore

impossible to say from the insufficient data at our disposal whether spontaneous cure ever takes place in this disease in cattle.

When we turn to the cases of cattle which were inoculated on the hill, and were therefore under observation from the beginning, we are struck by the rapid course of the disease. One animal certainly lived 287 days, but the remainder died, on an average, in twenty-six days from the date of infection. Most of these oxen were inoculated with a strain of this trypanosome, which had caused a rapidly fatal epidemic among a herd of milch cattle belonging to Mr. Walsh, at Kabula Muliro. In the short space of one month twenty-four of Mr. Walsh's cattle died, and in two months thirty-four had died out of a herd of about 300 head.

It may therefore be concluded that *T. pecorum* sets up a rapid and fatal disease in cattle.

Disease set up in Goats and Sheep by Trypanosoma pecorum.

The number of cases of this disease in goats and sheep which came under observation is too small to draw any conclusions from. At Mpumu the goats and sheep were not satisfactory experimental animals, as many of them died from some unknown cause. It was thought that as these animals usually lived in the valleys, and were often housed in their owner's hut during the night, the exposure on the top of the hill had a bad influence. One sheep was still alive after 168 days, and it is probable that most of the goats and sheep would have lived much longer if they had been kept under more favourable conditions.

Disease set up in the Smaller Laboratory Animals.

It is not necessary to describe in detail the action of *T. pecorum* on the monkey, dog, and smaller laboratory animals, as a reference to the table will show the average periods of incubation and duration. It will be seen that this is a fairly rapid and fatal disease in the dog, white rat, and mouse. In the monkey the average duration is about two and a-half months.

THE CARRIER OF *Trypanosoma pecorum.*

Glossinæ.—From experiments made in the laboratory at Mpumu, it seems probable that *Glossina palpalis* is capable of acting as a carrier of this trypanosome. Four experiments were made with ordinary wild Lake-shore flies, and of these one was successful. Four were also made with laboratory-bred flies, and one again came off. The latter experiment, however, with laboratory-bred flies, was not free from doubt; but from the other, which seemed free from doubt, it appears that *T. pecorum* can develop in *G. palpalis*, and infect a healthy animal after a period of twenty-one days. More observations are required. It may be noted that in no instance did *T. pecorum* appear in the blood of animals upon which freshly-caught Lake-shore tsetse flies had been fed. These flies were found to be naturally infected with *T. gambiense* and *T. vivax*. This is an argument,

though a small one, that *G. palpalis* is not the common or chief carrier of *T. pecorum.*

Tabanidæ.—There is some circumstantial evidence available to show that *T. pecorum* is carried by the *Tabanidæ.* In the valleys round Mpumu Hill, so far as we are aware, there are no tsetse flies at any time of the year. As a rule, there are a few *Tabanidæ.* The cattle belonging to the Commission went down to the foot of the hill every morning to graze, and returned to their kraal on the top at sunset. Half of the herd went to the east of the hill and half to the west. On both sides there was a small valley or glen, through which ran a small stream. In these valleys during the year, as a rule, a *Tabanus* or two or a *Hæmatopota* could be seen, but they were in small numbers. Now, it is a curious fact that at certain times of the year enormous numbers of *Tabanidæ* will suddenly appear in places where only a few are, as a rule, to be found. For example, Mr. Brown, at Mabira, who was collecting the biting flies of his district, wrote on March 14, 1909, that the *Tabanidæ,* which for months had been scarce, were then swarming everywhere in countless numbers, and he afterwards wrote that this invasion lasted about a month. The particular species which appeared at Mabira at this time was *Tabanus socialis* (Walk.).

So, in the same way, at Mpumu, the *Tabanidæ,* which had been rare, suddenly appeared in swarms. They were first seen in the valley to the west of the hill in September, 1909, and a month later in the valley to the east. Soon after this the cattle which had shown no signs of disease during the previous year were found to be suffering from *T. pecorum.* Those which grazed in the valley to the west were the first to be affected, and afterwards those which grazed to the east of the hill. The species of *Tabanidæ* in this case was *Tabanus secedens* (Walk.). In both groups of cattle there were cases of *T. pecorum* disease, so that the *Tabanidæ* had a reservoir from which to draw the virus.

Another sudden epidemic of *T. pecorum* disease occurred on Mr. Walsh's farm at Kabula Muliro, where, as stated above, thirty-four milch cattle died within two months in a herd of 300. The evidence is all against this epidemic having been caused by tsetse flies. During February and March, and again later in the year during August and September, as many as 100 fly-boys were engaged scouring this district for biting flies. *Tabanidæ, Hæmatopota,* and *Chrysops* were brought in, but not a single tsetse, although a reward of 5 rupees was offered for each specimen. The commonest *Tabanus* in this district during August was *varietus* (Walk.).

It may, therefore, in our opinon, be concluded that the trypanosome disease caused by *T. pecorum* can be carried from sick to healthy animals without the aid of *Glossinæ,* but what other species of fly, if any, acts as carrier is merely a matter of speculation at present.

Stomoxys.—Montgomery and Kinghorn state that they have strong evidence against this genus. At Mpumu several experi-

ments were made to attempt to settle this question, but although they were persevered in for months, they remained negative. *Stomoxys* are so numerous in every part of the country all the year round that it seems inconceivable that they can act as carriers. From October, 1908, until the following September, although numerous cases of cattle with *T. pecorum* in their blood grazed all day long with healthy cattle, yet not a single case of infection took place. The *Stomoxys* were exceedingly numerous all this time, forming a small cloud of flies round the cattle, and passing constantly from one animal to another, being driven hither and thither by the rapidly-swishing tails. This is a natural experiment on a large scale.

It will therefore require very convincing proof to bring this Commission to the belief that *Stomoxys* are carriers of this disease.

The subject of the carrier *T. pecorum* must remain in this unsatisfactory state for the present, but it is hoped that experiments which are at present being carried out at Mpumu may throw some light on this important part of the subject.

Cultivation of *Trypanosoma pecorum*.

One difficulty experienced at Mpumu in attempts to cultivate the various trypanosomes was that rabbits were not available to supply the blood for Novy and MacNeal's medium. The blood of rats, goats, and oxen was used; but in making the cultivation of trypanosomes a factor in their diagnosis uniformity must be of the first importance.

Another difficulty was the frequency of contamination of the tubes. This was, perhaps, to be expected in a laboratory on the top of a hill in the Tropics, with very free ventilation.

T. pecorum grows fairly readily on blood-agar medium. At the end of twenty-four hours clumps may be seen containing many trypanosomes, with their flagellar ends directed outwards and in active motion. The individual flagellates have irregularly-shaped granules of chromatin scattered through their body substance, and also many brightly refractile vacuoles. After forty-eight hours' culture every field contains many active trypanosomes, and also small clumps composed of ten, twenty, or more members.

After six days the trypanosomes are still very active; they vary much in size and shape, from the plasmodial to the elongated, flagellated, highly active trypanosome. After this they seem to degenerate, and in a few days living trypanosomes can no longer be found in the tube.

This description approaches to some extent that of the cultural characters of Dr. Edington's trypanosome from Zanzibar and *T. dimorphon*, but there is not that extraordinary growth which was described as covering several fields of the microscope. Whether this was due to the difference in the composition of the blood medium, or to the higher temperature at Mpumu, it is impossible at present to say.

CONCLUSIONS.

(1) *T. pecorum* is an important trypanosome disease of domestic animals in Uganda.

(2) It is similar in morphology, action on animals, and cultural characters to the *T. dimorphon* described by Laveran and Mesnil, and to Dr. Edington's trypanosome from Zanzibar, described in the *Proceedings*,* except that T. pecorum is not pathogenic to guinea-pigs.

(3) The carrier is unknown, but is probably a *Tabanus*, and not *Stomoxys*.

Miscellaneous.

LITERARY NOTE.

MESSRS. BAILLIERE, TINDALL AND COX announce that they have been authorized by the Department of Education of the Sudan Government to publish immediately the Fourth Report of the Wellcome Tropical Research Laboratories, Khartoum. The Third Report was issued in 1908, since when a great amount of important research work has been accomplished, and the announcement that a further instalment is to be expected should arouse the keenest interest among students of Tropical Medicine.

The thorough examination of the conditions of tropical life, as they present themselves in men, animals, plants, and insects, is the task to which this great Institution is devoted, and the Fourth Report, which is in three volumes, contains facts, observations and discoveries recently brought to light. It is the actual record at first hand of new contributions to the solution of problems of deep and world-wide importance.

The edition is, however, limited, and in order to ensure delivery of copies immediately upon publication, it is essential that orders should without delay be forwarded to the publishers.

ROYAL COLLEGE OF VETERINARY SURGEONS.

FELLOWSHIP DEGREE.

A MEETING of the Board of Examiners for this Degree was held at the College, 10, Red Lion Square, W.C., on Saturday, December 2. The following is a list of the successful candidates, together with the title of their respective theses:—

R. L. Phillips, "The Clinical Aspect of Infectious Pneumonia of the Horse."

A. F. Castle, "Sterility in the Mare."

F. J. Dunning, "East Coast Fever, particularly as applied to South Africa (Rhodesian, Red-water, or African Coast Fever)."

* B, vol. 81, p. 14.

ADDRESSES WANTED.

THE present addresses of the under-mentioned Members of the Royal College of Veterinary Surgeons are unknown. The Statutory Notices have been sent out by the Registrar, and unless an address is received during the year 1911 the names will not be included in the Register for 1912.

Name.	*Last address known.*
Bayes, James	Late of Agricultural Department, Cape Town, South Africa.
Bird, Robert H.	Fort Collins, Colorado.
Brassington, A.	15, Mornington Road, New Cross Road, S.E.
Casewell, W. Thos.	Newport, Salop.
Cobbledick, J. O.	Queen's Row, Clifton, Bristol.
Davies, Arthur W.	Lennox Taylor Co., Iowa, U.S.A.
Deakin, Herbert Walmesley	109, Welbeck Street, Ashton-under-Lyne, Lancs.
Dowell, Frank W.	128, Jermyn Street, St. James's. S.W.
Farrell, Capt. G. H. ...	Hyderabad (Deccan), India.
Fetherstonhaugh, H. H. ...	King's Somborne, Stockbridge, Hants.
Hall, James W.	40, High Street, Hawick.
Jackson, A. F. S.	Johannesburg Turf Club, Johannesburg, South Africa.
Kennedy, W. R.	216, Selhurst Road, South Norwood, S.E.
Muirhead, John T.	14, Merchiston Gardens, Edinburgh.
Scott, William	Royal Artillery, Victoria Barracks, Sydney, N.S.W.
Simpkin, F. A.	Grosvenor House, Horncliffe Road, Blackpool.
Smith, Steven Marsh ...	Late Capt. A.V.C.

Review.

THE ANNUAL REPORT OF THE VETERINARY OFFICER FOR THE NEWCASTLE CORPORATION.

FIVE years ago Newcastle-on-Tyne found itself in such a deplorable condition regarding its slaughterhouses that, through shame alone, it was bound to move in the direction of some reform or other. Unfortunately, there appeared to be no one

in evidence who either would or could advise the authorities as to what they really required. Eventually it was decided to spend some thousands of pounds on the reconstruction of a few obsolete slaughterhouses at the west end of their cattle market. In exchange for their money Newcastle inhabitants got about eighteen new slaughterhouses erected on the same site. These consist of seventeen small private slaughterhouses and one a little larger than the remainder, which the authorities designate a public slaughter hall. This it is named simply because the corporation itself holds the licence, and charges so much per head for animals slaughtered there. But it only provided accommodation for about a dozen cattle and about fifty sheep, the word "public" being a misnomer.

The following year a veterinary officer was appointed to the city for the purpose—besides acting as veterinary inspector—of supervising the whole of the meat and food inspection and slaughterhouses. According to his annual reports, we find that there then remained some 132 slaughterhouses. But although these premises included the eighteen new ones, he was not satisfied that any of them were desirable.

Faced with the supervision of a large number of obsolete insanitary and unfit premises, it would appear that some uphill work was in store. During the next year or two the very worst were brought prominently before the Sanitary Committee, with the result that no less than twenty-one of these premises were wiped off the map. Shortly afterwards another one was closed, leaving a grand total of 110 separate slaughterhouses. These consisted of five groups, varying from six to eighteen each, and fourteen separate premises.

One group of	40
,, ,, ...	18
,, ,, ...	18
,, ,, ...	7
,, ,, ...	6
,, ,, ...	7
Separate premises	14
	110

The next step was to deal with the worst of those remaining. These consisted of the largest group in the centre of the city, forty in number. These premises (according to the veterinary officer's reports) were surveyed by the Sanitary Committee, who decided not to relicense them in the future. As time went on it was found that a large number of butchers would have no place in which to slaughter their stock, and, recognizing this difficulty, the Sanitary Committee therefore—rather than treat the butchers too harshly—decided to grant temporary licences for short periods. Had the committee been pushed too quickly, probably the result would have been that more new but obsolete slaughterhouses would have been erected at the cattle market

to make room for the butchers cleared out of the forty bad premises. The Sanitary Committee, it is believed, are almost unanimous now as to the requirements of a public abattoir for the City of Newcastle-on-Tyne. Moreover, the butchers of the city are almost equally of the same opinion. The licences of the forty bad slaughterhouses just referred to—it is believed—terminate next March, and then it is highly probable that the whole question of public abattoirs will be tackled. Perhaps it is well for Newcastle that during the past three or four years this subject—a difficult one—has been handled steadily, so that, instead of more obsolete slaughterhouses, the butchers and the corporation have become more agreed as to the requirements of an abattoir.

Newcastle is a large city, extending several miles, where slaughterhouses are scattered widely over the district, proper inspection consequently—as pointed out—being an absolute impossibility. A strong example of the fact that separate premises—run privately—in different parts of the city make it impossible to supervise as is considered desirable, not only from the point of view of transmissible disease, but also from the point of view regarding cleanliness, is given in the veterinary officer's annual report of last year, *e.g.*, maggoty fat.

Newcastle is a wealthy landowner, for at the east end she possesses acres of land which adapt themselves admirably for the erection of not only abattoirs, but also cattle markets, and everything else appertaining to the business concerning meat, &c. This land has the railway running past it, is splendidly situated for a siding; in fact, for everything required. Even assuming that they decided not to remove the present market, there is a large site adjoining, known as the Old Infirmary site, between the cattle market and the railway—in fact, there being only a street's width separating the two—where the corporation could find room on which to erect an abattoir. This land also is the property of the corporation. Will the Newcastle Corporation muddle things again, or will they—whilst the opportunity is open to them—use their land for the erection of an institution more urgently needed at the present than any other—now? Surely the ratepayers will not allow such an opportunity to escape and thus be—in the future—put to the expense of a more costly site for an institution that will have to come sooner or later.

J. B.

Translations.

SHYING IN HORSES.

By RAYMOND NESENI,

Veterinary Surgeon in the 8th Regiment of the Austrian Dragoons.

According to Chief Lieutenant v. Máday, (1) shying in the horse is "merely a habit which has been contracted through faulty and lazy breaking-in or training." Kirnbauer (2) considers

that shying is due partly to irrational training and handling and partly to faulty eyes. Of the defects in the eye, sclerosis of the lens is the chief, which, according to Kirnbauer, is met with in 95—98 per cent. of shying horses. Bayer (3) in connection with the causes of shying writes: "If not due to turbidity and other pathological changes brought about by inflammation, it is generally caused by a refraction anomaly due either to a high degree of myopia or severe astigmatism."

Since Kirnbauer's remarks interested me I examined the shiers present in the regiment, 37 in number, with the following result: Normal eyes 13.5 per cent., sclerosis of the lens 62.1 per cent., myopia 10.8 per cent., other ocular defects 13.6 per cent. Of other defects I found: Turbidity of the conjunctiva, enlarged or low hanging corpora nigra, pigment spots on the anterior capsule of the lens (very frequent), as well as slight opacities of the lens.

Kirnbauer asks: "Can shying be foretold in presence of certain visible changes in the eye?" and this is his answer: "The horse with sclerosis shies as a rule, so that the probability of a disposition to shying in the presence of this defect is great." According to my observations this is not the case. Sclerosis of the lens, which according to Bayer is very frequent in horses, could be established by me in 65 per cent. of a further 470 horses examined. If one now takes into consideration that the examined shying horses only represented 7.7 per cent. of the whole regiment, and in these only a little over a half (about 4½ per cent.) showed sclerosis, it seems that the probability of disposition is not so great as Kirnbauer would have us believe. Further trials, however, need making before one can express an exact judgment on the matter.

LITERATURE.

(1) v. MADAY: "Vicious and Good-tempered Horses," *Kavallerist Monat.*
(2) KIRNBAUER: *Oest. Woch. für Tierheilkunde*, 1911, No. 15.
(3) BAYER: *Augenheilkunde*, 1900, p. 476.

(Oesterreichische Woch. für Tierheilkunde.)

A CASE OF INFLAMMATION OF THE BRAIN AS A RESULT OF DISEASE OF THE LEFT OLFACTORY BULB THROUGH BOTRIOMYCOSIS.

BY STAFF VETERINARY-SURGEON WERRMANN.

THE service horse Rachel, of the 2nd Company of the 1st Training Battalion No. 12, fell ill on June 10, 1911, showing symptoms of inflammation of the brain.

The clinical position was as follows: Rachel had shown symptoms of restlessness on the afternoon of June 9, but these disappeared in the course of an hour. According to the attendant, the horse climbed up into the crib, soon got down again, pressed her head against the wall, remained in this

position some time, and then the attack passed away. Only part of the evening food was eaten up, whilst the morning feed on June 10 remained untouched. An examination undertaken now showed the following: Rachel held her head sunk under the manger, and only took up another position slowly when asked to do so. The pupil is contracted, the conjunctival and nasal mucous membrane are slightly injected, the pulse is frequent, there is no rise of temperature. On bringing out of the stall the animal rushed violently forwards with a fixed gaze, and could only be brought by two men into the sick box with difficulty. Then circular movements to the right began immediately. After an hour, these movements ceased and Rachel remained standing with sunken head in the corner of the box, and only with great effort could she move to take up another position. Treatment undertaken immediately consisted in injection of pilocarpine and arecalin and ice to the poll.

In the afternoon circular movements to the right commenced again, but for the rest the position remained the same. Taking of food was at a standstill. On the next day there was slight improvement. Circular movements were rare and only continued for a short time, but symptoms of depression occurred regularly and lasted longer; the animal laid down and remained prone with outstretched head and neck for an hour at a time. When called, she sprang up in a fright and again commenced the movements.

On June 12 the condition was much better. Food was taken, and if not normally yet in sufficient quantities, and this condition continued until June 17, when symptoms of intense disturbance set in. The head and neck, after these fury attacks, were greatly elevated, and the animal sought to hold on to the wall, whilst at the same time loud grinding of the teeth could be heard. Alternating with this, the circular movements occurred, after which Rachel threw herself down violently and spasms of the muscles of sight ensued. The disease gradually got worse, until on June 22, at half-past five at night, death occurred.

On opening nothing abnormal was found in the thoracic cavity, but in the abdominal cavity there was a healed up peritonitis with numerous growths and fibrous adhesions occupying a small area, but all the organs were healthy. Section of the cranial cavity showed the dura mater hyperæmic and riddled with hæmorrhages and its internal surface covered with small fibrinous rings. The vessels of the pia are very hyperæmic. On the left side of the base of the skull the pia is firmly united to the dura to the extent of a mark piece in area. The brain substance is œdematous superficially. The ventricles of the brain are filled with moderate amounts of a clear yellow serous fluid. The olfactory bulb is knotty and roughened irregularly throughout its whole extent. The whole appearance gave one the impression of a tumour. The colour is greyish white, the consistence moderately hard. The cut surface is greyish white in colour, but nothing of the normal brain substance remains. In this changed tissue are smaller and larger yellowish masses of brittle

granular consistence. In the growth between the pia and the dura there was a yellowish nodule the size of a pin's head.

The whole *post-mortem* appearances resembled those of tuberculosis. The disease was declared to be botriomycosis by Dr. Joest. This is the second case of the kind that has been noticed. The first was recorded by Dr. Joest in his annual report of proceedings at the Dresden College.

Joest considers that infection took place through the nasal cavities.

(*Zeitschrift für Veterinärkunde.*)

THE ASCARIDES OF THE HORSE AND THEIR PREVENTION WITH ANTIMONY TARTRATE.

By GRIMME.

Tartar emetic has already caused numerous controversies in the German Press. One set of these affirm the non-toxicity of large doses (20 grm.); the other warns against the danger of less than half these doses, with the result that a doubt existed which profited a parasite that could not be tackled with certainty.

The author has treated about 12,000 to 15,000 horses, and utilized in good and bad years 1 kilogramme of tartrated antimony. He has noticed that the ascarides are much more frequent in young subjects, and most of all in those under a year old. In two cases he has observed them in foals eight weeks old that had never left the stable, and had therefore never been infected at pasture.

The diagnosis of the presence of ascarides is very difficult when one is not assisted by their expulsion in the fæces. The violence of borborygmus, frequent yawnings, localized sweating at the flanks, cause one to make investigations into the cause of the unexplainable emaciation. As for treatment the author is an enthusiastic partisan of antimony tartrate; if result has to be long waited for, he does not hesitate to administer a fresh dose of the drug. In subjects of 2 to 4 years he gives a dose of 15 to 20 grm.; foals of one year receive 10 grm. (about 2½ dr.), and those of six months 5 grm. The division of these doses into three parts during the day only offers some disadvantages. This is how it is used: The subject to be treated is given no water the evening before dosing; the tartrated antimony is dissolved in a pail of water; one uses a third of it at six o'clock in the morning, a third at seven o'clock a.m., and a third at eight o'clock in the morning. The ration is only given at half-past eight. Purgatives are useless if the feed comprises green-stuff or carrots.

Fatal cases published up to the present are, according to the author, due to a defective method of administration or to some other cause.

(*Deutsche Tierärztliche Woch.*)

AN INTERESTING BRANCHIOGENOUS TOOTH HETEROTOPY (A TOOTH IN THE BRAIN) IN A HORSE.

By JOEST.

Veterinary Councillor Wilhelm, of Zittau, sent the head of an eleven-year-old horse to the Institute which had died of "subacute inflammation of the brain." The history was that the horse showed first time symptoms of a subacute inflammation of the brain five months before death and had previously been healthy. The symptoms lasted fourteen days and then declined. About eight days later the animal again fell ill and did not recover. Both attacks commenced with slight fever, the horse made circular movements to the right and inclined its uplifted head to the right, there were disturbances of consciousness and sensation.

Pathological-anatomical examination showed no visible external changes in the skull. It was opened in the usual way, but the brain could not be taken out intact as one part of its base was firmly adherent to the dura.

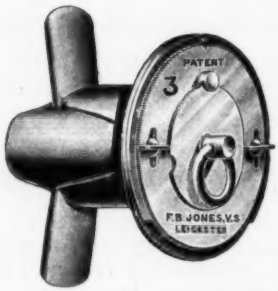
The brain itself showed at its base, in the neighbourhood of the right trigonum olfactorium, a bony hard protuberance, adherent to the dura but not to the bones of the skull, which appeared four-cornered and quite blunt, and about the size of the crown of a molar tooth of the horse. This prominence was yellow in colour, cut obliquely inferiorly, directed to the right, and was covered with a thin layer of connective tissue. Two root-like continuations of the crown of the tooth were partly visible when taking the brain out of the skull, and after dissection they could be plainly seen lying on the ventral surface of the brain. In this condition the whole brain was hardened in formalin.

The teeth of the horse could not be examined as only the skull had been sent. The anomaly was plainly a tooth, and its two roots and four-cornered crown correspond to those of a molar. It was doubtless a congenital tooth heterotopy. Such a condition can only arise from embryonal branchiæ diversion and is consequently of branchiogenous origin. Joest considers that teeth in the brain should not be classed as teratomes, but as simple malformations, for which the best name is branchiogenous tooth heterotopy.

(*From the Report of the Royal Veterinary College in Dresden*, 1910.)

JONES' TRACHEOTOMY TUBE.

MANY tracheotomy tubes have been devised from time to time, but we consider that none has eclipsed that invented by the late F. B. Jones, M.R.C.V.S., of Leicester, as illustrated below. This tube has the great advantage of evenly distributing pressure all round



the operation wound, and so reducing the probability of the formation of excessive granulations. The tubes are very simple, and very easily inserted and removed, and are very durable. They are made in four sizes, and may be obtained from the inventor's daughter, viz., Miss Jones, Aberbraint, Leicester.

Letters and Communications, &c.

Professor Gofton; Major Bishop, R.A.,; Mr. Chambers; Professor O'Connor; Mr. Townsend; Mr. Mayall; Mr. F. Bullock; Dr. Rutherford; Board of Agriculture and Fisheries; Department of Agriculture and Technical Instruction for Ireland.

Books and Periodicals, &c., Received.

Bulletin of the Bureau of Sleeping Sickness; Report of the Director-General of the A.V.C.; Report of the Civil Veterinary Department of the Central Provinces; Agricultural Journal for Rhodesia; Agricultural Journal for Union of South Africa; Mr. Merck's Annual Report; London University Gazette.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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